

Railway Age Gazette

Including the Railroad Gazette and the Railway Age

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (Inc.), 83 FULTON ST., NEW YORK.

CHICAGO: 417 South Dearborn St. CLEVELAND: New England Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, *Chairman of the Board.*

E. A. SIMMONS, *President.*

L. B. SHERMAN, *Vice-President.*

HENRY LEE, *Sec'y & Treas.*

The address of the company is the address of the officers.

EDITORS:

W. H. BOARDMAN, *Editor.*

ROY V. WRIGHT

F. W. KRAEGER

SAMUEL O. DUNN,

B. B. ADAMS

H. H. SIMMONS

Editorial Director.

G. L. FOWLER

R. E. THAYER

WILLIAM FORSYTH

E. S. FAUST

BRADFORD BOARDMAN,

E. T. HOWSON

S. W. DUNNING

Managing Editor.

W. E. HOOPER

CLARENCE DEMING

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00
Canada	6.00
Foreign Countries (excepting daily editions).....	8.00
Single Copies	15 cents each

Shop Edition and the eight M. M. and M. C. B. Convention Daily Issues, United States and Mexico, \$1.50; Canada, \$2.00; foreign, \$3.00.

Engineering and Maintenance of Way Edition and the four Maintenance of Way Convention Daily issues, North America, \$1.00; foreign, \$2.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 51.

AUGUST 4, 1911.

NUMBER 5.

CONTENTS

EDITORIAL:

Editorial Notes	201
Government Regulation of Prices and Wages.....	202
New Books	203

LETTERS TO THE EDITOR..... 203

ILLUSTRATED:

Substructure of Kentucky and Indiana Bridge.....	208
--	-----

MISCELLANEOUS:

Government Ownership of Railways.....	204
Proposed Legislation Requiring Steel Passenger Cars.....	211
Dead Weight and Freight Rates.....	212
Letters from an Old Railway Official.....	215
Foreign Railway Notes	204

SHOP SECTION.

EDITORIAL:

Editorial Notes	217
Proposed Consolidation of General Foremen's and Tool Foremen's Associations	218
Railway Mechanical Department Organizations.....	218
Side Lights on the Tool Foremen's Convention.....	219
General Foremen's Association	220
Mechanical Articles During July.....	220

LETTERS TO THE EDITOR..... 221

ILLUSTRATED:

Tool Foremen's Association	222
Model for Indicating Water Level in Locomotive Boiler.....	236
Tire Heater	237
Cylinder Packing Ring	237
Shop Kinks	252

MISCELLANEOUS:

General Foremen's Association.....	238
Foreign Railway Notes.....	237

GENERAL NEWS SECTION 255

OF the 54,609 passenger coaches in service in this country, December 31, 1910, 2,927, or 5.3 per cent., were of all-steel construction, and 1,481, or 2.7 per cent., were equipped with steel underframes. Bulletin No. 21, issued by the special committee on the relations of railway operation to legislation, which is reproduced on another page of this issue, contains the first complete data which has been compiled on the number of all-steel and steel underframe passenger cars in service and also under construction. The rapid rate at which such cars are being introduced is shown clearly by the fact that 24 per cent. of the 2,000 passenger cars acquired in 1909 were of all-steel construction, while 21 per cent. were equipped with steel underframes. Of the 3,783 cars acquired in 1910, 53 per cent. were all-steel and 14 per cent. had steel underframes. Of the 4,074 cars which will be acquired during the present year, 62 per cent. will be all-steel and 14 per cent. will have steel underframes, leaving only 24 per cent. of new cars of wooden construction. At the close of 1908 only 0.8 per cent. of the passenger cars in service were of all-steel construction, while at the close of 1911 fully 9.3 per cent. will be so built. In the same time the number of cars with steel underframes will have increased from 1 to 3.5 per cent., or at a much lower ratio, while the percentage of wooden cars in service will have dropped from 98.2 to 87.2 per cent. The cost of replacing all the present wooden cars with steel, which would be required if some of our legislators had their way, is estimated at \$630,489,400.

AFTER the decision in the commodities clause case the Delaware, Lackawanna & Western promptly formed the Delaware, Lackawanna & Western Coal Company and distributed as a dividend to its own stockholders pro rata the stock of the coal company. The Standard Oil Company of New Jersey has announced that it will do a somewhat similar thing on a much more complicated scale in regard to the stock of its subsidiary companies. There are 33 of these subsidiary companies, the stock of which is held either by the Standard Oil Company of New Jersey directly or through the National Transit Company, and each stockholder in the Standard Oil Company of New Jersey will receive, in addition to the certificate he now has, stock certificates representing shares, or fractional shares, in each one of the heretofore subsidiary companies. The Standard Oil Company of New Jersey continues in business as a purely manufacturing company. In the case of the Delaware, Lackawanna & Western the stock of the railway company was so closely held among a small group of wealthy men that almost without exception the railway stockholder took up and held, it is generally understood, the stock in the coal company. In the case of the Standard Oil it is believed that the Rockefellers, with their close associates, own a clear majority of the stock of the Standard Oil Company of New Jersey. It is conceivable that they will be able and willing to continue to hold the same proportion of stock in each of the subsidiary companies. If this is the case the management of the various properties can continue to be carried on in harmony with some general policy, and the wastes of competition will still be avoided. The Standard Oil Company, however, has a large number of stockholders who presumably are almost entirely ignorant of the comparative value and earning power of the subsidiary companies. It would seem that when the stocks of these subsidiary companies come on the market there would be afforded an opportunity for speculation by insiders that would amount to "heads I win, tails you lose," as far as the general public are concerned. And also, if the assumption that the Rockefeller interests can hold and will continue to hold a clear majority of the stock of each of the subsidiary companies is wrong, then the possibilities of competition, price fluctuations, higher cost of manufacture, etc., are quite apparent. If such competition should eventually come about, it would again be the small stockholder as well as the general public who would suffer. Of course, all of the dangers in such a reorganization as that of the Standard Oil to the small stock-

holder are much greater in the case of an industrial company than would be the case of a railway company. The Standard Oil Company is the largest example of an industrial company which has kept its corporate affairs strictly secret, but there are many other smaller industrial companies which have pursued very much the same general policy. The tendency toward regulation is commented on below. Railways are compelled to make their corporate affairs public, but if a course of publicity were forced on industrial corporations it is rather hard to see where the line could be drawn between a public and a private corporation.

A SUGGESTIVE fact in connection with the control by the New York, New Haven & Hartford of some 1,300 single track miles of street railways is that, in Connecticut at least, no attempt has been made to suppress competition with the steam lines. The general policy is illustrated by the fact that quick trolley service has been established between New Haven and Waterbury over the trolley routes, both in effect paralleling the steam road, though the Nangatuck valley and both the trolley roads being absolutely under the steam corporation's control. Given control of some hundreds of miles of parallel trolleys by a steam corporation owning practically all the outstanding trolley stock, its most profitable policy is not separate but co-operative. The steam and trolley parallels must be treated in close combination and with full knowledge of the fact that the dollar earned on the one is full substitute for the dollar earned on the other, so long as each dollar goes to the same treasury. On the New Haven's trolley system, whether in Connecticut, Rhode Island or Massachusetts, there has been an increase of traffic so steady and so large as to leave, relatively, any normal increase of steam business far behind. With the earned dollar still going into the parent corporation's strong box, it is, clearly, wise to develop the trolleys in the direction of greatest earning power, even though some trains on the steam parallels run thin. Another point worth attention is the New Haven's plan of keeping the Connecticut trolleys intra-state instead of letting them reach out into adjacent states. Their holding company is a Connecticut corporation holding practically only trolley lines within the state. The barrier to federal interferences is obvious, and an asset of the future not to be underrated.

GOVERNMENT REGULATION OF PRICES AND WAGES.

SOME weeks ago, testifying before a committee of Congress, E. H. Gary said that the United States Steel Corporation would welcome federal regulation of its prices. Now comes Attorney General Wickersham, and in a speech before the Minnesota Bar Association at Duluth, Minn., by broad implication advocates the creation of a federal trade commission to regulate the prices of large industrial corporations in general.

It has sometimes been suggested by railway men that the great and rapid extensions of federal regulation of transportation would foster a public sentiment in favor of the socialization of all forms of industry and commerce. The large shippers who have been active in the agitation against the railways have refused to take this suggestion seriously. They have said that the railway is a quasi-public corporation and, therefore, may be subjected to forms of regulation which could not legally be applied to industrial corporations.

In reasoning thus they have overlooked one very important fact to which Mr. Wickersham referred. This is that the railway is held to be a quasi-public corporation, and, therefore, subject to public regulation, because, as the courts say, it is "clothed with a public interest"; and it is "clothed with a public interest" because it has, within certain limits, a natural monopoly, and provides a service in which the public is vitally interested. Now, when an industrial concern, or combination, gets a virtual monopoly of the production of or commerce in some commodity the sale of which at reasonable prices is of great importance to the public, such concern or combination

becomes in fact as much "clothed with a public interest" as a railway; and when it can be shown that such concerns have in fact become thus affected with a public interest, the courts are not at all unlikely, as Mr. Wickersham intimated, to apply to them the same principles of law that they apply not merely to railways, street railway companies and other public utilities, but also to several other classes of concerns. In the famous case of *Munn v. Illinois* (94 U. S. 113) it was held by the Supreme Court of the United States that the state of Illinois had the power to regulate charges for the storage of grain in warehouses in Chicago, the court saying:

"When one devotes his property to a use in which the public has an interest, he in effect grants to the public an interest in that use, and must submit to be controlled by the public for the common good to the extent of the interest he has thus created."

And in the case of *Cotting v. Godard* (183 U. S. 79) it was held that—

"Tested by the rule laid down in *Munn v. Illinois*, it may be conceded that the state has the power to make reasonable regulation of the charges for services rendered by the stock-yards company. Its stock yards are situated in one of the gateways of commerce, and so located that they furnish important facilities to all seeking transportation of cattle. While not a common carrier, nor engaged in any distinctively public employment, it is doing a work in which the public has an interest, and therefore must be considered as subject to governmental regulation."

Can anybody seriously question that the United States Steel Corporation, the Standard Oil Company, and the packers' trust, for example, have now even more complete monopolies of their respective lines of business than is possessed by any railway or combination of railways in the United States? And do not some of them, at least, deal in commodities which are of as great consequence to the public as is the service of transportation or of storing grain? Following out this line of reasoning, we are led to the conclusion that it is highly probable that under the present federal constitution Congress could regulate the prices of many large trusts.

That there is apt to be a movement for such regulation seems now to be very highly probable. If it does develop, railway managers will be able to regard it with some equanimity. At present the large industrial concerns can, and do, complain to the Interstate Commerce Commission if they think that the rates which the railways charge, or propose to charge are unreasonable. On the other hand, when the railways go into the market to buy lumber, steel, rails, etc., they have to pay whatever prices the large combinations choose to exact, and those prices are never fixed according to the same principles which those who make them contend should govern the making of railway rates. It might be comforting to railway men to know that, while there was a tribunal which regulated the amount that the railways should receive for their services, there was also a tribunal to which the railways could appeal to regulate the prices that they might be compelled to pay for their lumber and rails.

There is one point, however, that Mr. Wickersham overlooked. This is that there are not only industrial trusts, but also labor trusts, and that many of these labor trusts exercise even more complete control over the wages that shall be paid to their members than the railways exercise over their rates or the industrial trusts exercise over their prices. Should we not go farther and create another commission to regulate wages? As already said, when railways in the past have suggested that one of these days there would be a movement for regulation of the prices of industrial corporations, the managers of these concerns have refused to take the suggestion seriously; and if the suggestion be now made that after the government shall have adopted the policy of fixing the prices of industrial concerns it will turn its attention to the regulation of the wages of labor, the labor leaders will probably scout the idea. But is it not obvious that if the government is to regulate railway rates and prices, sooner or later it will have to regulate wages, because wages enter so largely into rates and prices that they cannot be controlled unless wages also are controlled? The labor unions are a pretty strong element in American politics, but they are vastly outnumbered by those who do not belong to labor unions; and when this great majority found, as it certainly

would find, that the prices that they had to pay depended largely on the wages that organized labor received, they would not long leave organized labor to work its will, as it does now in the transportation and many other industries.

The prospect of having not only a commission to regulate the rates he may charge, but also another commission to regulate the prices he must pay, and still another to regulate the wages he must pay, must be very refreshing to the railway manager, who sometimes grows weary of trying to make government-made rates and trust-made wages and prices culminate in profits. But, looking at the matter not as a railway man, but as a citizen, he, in common with other thoughtful citizens, is apt to have his doubts as to the magnitude of the benefits that the public will derive from an extension to other branches of industry of the policy now applied to railways. Our policy of regulation of railways has not yet proved so clear and complete as success as to justify taking it as an example to be followed in dealing with other industries. It seems that if the state and federal governments, instead of extending their regulation of industry, would repeal some laws already in effect, better results might be obtained. For example, a reduction of the tariff on commodities made by trusts would involve a much less dangerous extension of governmental power and would be quite as apt to reduce prices as the creation of a commission for that purpose. If the government would undo some of the things it has done which have tended to create trusts and monopolies and to raise prices, it might develop that there is much less need than many now imagine for the insertion of its finger into every commercial and industrial pie, big and little, in the country.

NEW BOOKS.

Railway Rate Theories of the Interstate Commerce Commission. By M. B. Hammond, Professor of Economics and Sociology, Ohio State University. Published by Harvard University. Cloth, 5 3/4 x 8 3/8. Price \$1.00 net.

Professor Hammond has made a study of a large number of the decisions of the Interstate Commerce Commission, and through this inductive study has arrived at his conclusions as to the theories according to which the commission regulates rates. The author takes the characteristic academic view of the proper ways to make and to regulate rates. His leaning toward the cost of service theory, and his lack of knowledge of the practical conditions which make its general and uniform application impossible, are evident throughout. But this does not seriously impair the value of the book. It is clearly, concisely, and interestingly written and logically arranged and throws more light on the principles according to which the commission has acted, and the changes which have gradually taken place in those principles, than any other book that has up to the present been published.

The commission in early decisions pointed out that railway rates in the United States had usually been based mainly on the value of the service, saying in their first annual report, "Such method of apportionment would be best for the country because it would enlarge commerce and extend communication; it would be best for the railways, because it would build up a large business, and it would not be unjust to property owners, who would thus be made to pay in some proportion to benefits received."

Professor Hammond's analysis shows that the commission has been steadily drifting away from this theory and tending more and more toward the adoption of the cost of service theory. These changes in the commission's attitude, as is indicated by the author, have been due largely to changes in its personnel. While a strong advocate of the cost of service theory, Professor Hammond is judicial in his tone throughout, and while most railway men will refuse to accept his conclusions, they will nevertheless read his book with much interest and profit.

Letters to the Editor.

THE COSTLINESS OF FREIGHT TARIFFS.

LOUISVILLE, Ky., July 13, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

There is probably no other single item of railway operation today that needs closer checking up than that of the compilation and printing of freight tariffs. That the railways are spending several millions of dollars yearly for the compilation, printing and distribution of their freight tariffs showing the cost of transportation is almost unbelievable, yet it is a demonstrable fact. Instances can be cited where the cost of compilation, printing and distribution of one tariff containing a few hundred destinations, the majority of which are unimportant towns and to which the movement of traffic is light from the points of origin shown therein, for a period of three years, was more than one hundred thousand dollars. The tariff referred to is compiled by one of the joint traffic associations, which association has expended in the last three years near to three hundred thousand dollars for compiling, printing and distributing twenty-eight tariffs, of which expense more than two hundred and twenty-five thousand dollars is chargeable to the cost of printing, over twenty thousand dollars to distribution, over five thousand dollars to miscellaneous, and the remainder to clerical salaries.

When it is considered that three hundred thousand dollars represents a yearly return of 5 per cent. for three years on an investment of two million dollars, the magnitude of the expenditure can be appreciated, and as there are several other traffic associations compiling many more tariffs and expending even larger sums than the one referred to, and as the individual lines are compiling thousands of their individual tariffs, it can be seen that a prolific field is open for study. An investigation of this important department would probably reveal that there are four underlying causes for the unnecessary cost incurred:

First: The too frequent changes in minor rates, making necessary the publication of expensive supplements to the original tariff or the reissue of the tariff proper.

Second: The employment of clerks to compile tariffs, who are not properly trained and experienced in the preparation of "printer's copy." When consideration is given to the fact that tariff typesetting costs from sixty cents to one dollar per hour (depending upon the locality) the importance of preparing copy in the most legible manner possible cannot be overestimated. Investigation will develop the fact that the cost of alterations caused by the carelessness of clerks preparing copy forms one of the chief items of expense, a cost which could be eliminated if this feature were given the proper study and attention.

Third: The reissuance of tariffs in compliance with some technical requirement. Instances can be cited where as much as seventeen thousand dollars has been paid out to cover the reissuance of tariffs simply to comply with an immaterial technical rule without the changing of a solitary rate.

Fourth: Exorbitant prices charged by printers. During the past three or four years the cost of printing has increased enormously. This can probably be attributed to the fact that the work is not let out on the proper competitive basis, and to a large extent in some cities to those big printers who, being in position to render satisfactory service, can form a "gentlemen's agreement" to charge uniform prices.

While it is obvious that it will always be necessary for the carriers to expend large yearly sums for the compilation, printing and distribution of their freight tariffs, an impartial investigation would develop the equally obvious fact that the expenditures in the past have been far beyond what should have been necessary.

H. G. M'LEAN,
Chief Rate Clerk, Southern Railway.

COLLEGE MEN IN RAILWAY WORK.

New York, July 18, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The letter from "1903," in regard to College Men and Railway Work, printed in your issue of July 14, really needs a reply.

"1903" is evidently impatient for immediate promotion and is not a good mixer with his fellow men. When the somewhat exaggerated tone of his letter is brushed over so as to take off the sharp corners, it leaves a pretty good outline of what a young graduate may expect to meet in his first few years of work, and I offer the following suggestions with the hope that they may be helpful to him and to many others.

Don't expect to be made the pet of the office, but take the work as it comes and show your superior worth by getting good results. That is what the officer in charge over you will be looking for.

Don't allow odious comparisons to be made between your education and the education of those who have been less fortunate than yourself. It is the character back of the education that makes the man, and some of the grammar school graduates may have acquired a knowledge of details and be of such character that their services are temporarily, at least, of more value to your employer than your own.

The knowledge of pure, as well as applied, mathematics and all other studies that are not used frequently will soon become hazy, but that need be a source of no misgivings; the mind has had the benefit of college training; the habit of logical reasoning has been formed; the ability to read over a scientific treatise and cull out the portions bearing upon the problem in hand has been acquired—the young engineer should now bend every effort toward mastering the practical details of the work in which he may be engaged.

The railway field is broad, and although the engineering for ordinary improvements and construction is generally simple, the vast problem of transportation in all its branches requires men of keen perception, large experience, and almost unlimited energy, resourcefulness and executive ability.

There are plenty of openings for young men with the right qualifications in almost any business, and railroading is no exception. He who shows promise of being able to accomplish good results will surely have the door to advancement opened for him without getting mixed up with political graft.

YALE 1894.

The various railways which have already been built, together with those under construction in Syria, and those projected in Syria and in the neighboring states, are already beginning to have an appreciable effect upon Beirut, which is noticed principally, at the present time, by the rise in values of all real estate. In the past Beirut has always been a leading center of learning, business, and finance, and it now bids fair to become of still greater commercial importance by reason of its connections with many important railway lines. The following additional information gives an idea of how these various railway extensions are regarded in Beirut. The construction of the Damascus-Haifa and the Homs-Tripoli railways has caused many people of Beirut to fear that the commerce of Beirut might be adversely affected by these railways, while many others have thought that the Homs-Tripoli line would become and remain the sea outlet of Aleppo. It has now been proved that the Haifa line has not caused a sensible decrease in the traffic on the Beirut-Damascus line, and that Beirut remains the natural outlet, not only of Lebanon, but also of Damascus and a good part of the interior beyond. As for the Homs line, it will, no doubt, divert to Tripoli all that traffic which Aleppo and the regions of Homs and Hama formerly sent out to Beirut; but Aleppo will evidently abandon this new line as soon as that city is connected with the sea by a shorter line. But this is for some future time, however.

GOVERNMENT OWNERSHIP OF RAILWAYS.*

BY FAIRFAX HARRISON.

President, Chicago, Indianapolis & Louisville.

There is an Oriental fable of a discontented shepherd who was ruined by the accomplishment of his own wishes: he prayed for more water than he needed, the Ganges was turned into his grounds and his flock and cottage were swept away by the inundation. Can we find a moral in this for our present enquiry? The American is essentially a practical person. If we can demonstrate to him that he already has all he needs, it is not necessary to argue further, but it may not be out of place to point out that not only is government ownership of the railways unnecessary for his protection but that there are positive dangers lurking in the proposition.

It will be recalled that on his return from a tour of the world several years ago a certain Peerless Leader publicly proposed a political programme of government ownership of the railways—and that the suggestion fell still-born, even in his own party of radical tendencies. But in the interval we have seen other as novel and perhaps not less radical political principles propounded and seriously discussed, so while the progressive elements in contemporary American public life have not yet sought seriously to revive the suggestion that the government should take over our railways, it must be recognized that the doctrinaire opinion emanating from some of our colleges, which has been the spring of many current political dogmas, has not entirely abandoned this supposed solution of the railroad question, and that it is quite possible that it may yet be made a live political issue.

In any event the fact that certain European countries today own and operate some or all of their railways, that Australasia has built up her railway system on that basis, suffices to make the question one worthy of serious economic discussion, and, of course, it must be a favorite topic with that large and growing school of opinion whose thesis is that all public utilities should be in the hands of government. Our generation has seen a remarkable growth of municipal activity in the operation of municipal facilities; water works, gas and electric lighting plants have been taken over by cities, and, in certain instances, successfully maintained. The experiment has even been tried of municipally operated street railways, though today the pendulum of opinion has rather swung away from that experiment and the practical social democrat seems for the moment to content himself with public ownership of street franchises leased and operated by individual *entrepreneurs*. Because certain public utilities can be proven to be safe in the responsible charge of a municipality, it does not follow that all public utilities should be operated by political public authority. The logic of such an argument may seem complete, yet it is perhaps subject to the fallacy of the undistributed middle. But, even if the argument was logically sound, a moment's reflection upon the history of our successful political institutions will demonstrate that the difference between Anglo-Saxon and Latin processes of government lies largely in the daring disregard by the Anglo-Saxon of all logic in shaping his political destiny. Our principle has been that logic is magnificent but it is not politics.

Before we proceed with our argument it must be admitted that the advocates of government ownership of our railways are not all doctrinaires or radicals. Not a few of them are to be found among the owners of railway securities, for such have been the uncertainties of the railway industry in recent years by reason of a variety of economic causes (among which may be cited as not the least the realized expectation of labor in constantly increased wages, and the accomplished requirement of governmental authority in matters adding arbitrarily to the expenses of operation), that many railway security holders, trembling over the uncertainty of the return on their invested savings, would welcome the opportunity to exchange what they have for the assured and stable income of a government bond. Indeed a

*An address before the Conference on Southern Problems at the University of the South, Sewanee, Tenn., August 1, 1911.

railway security holder upon whom the government should today make demand to surrender his property would be much in the position of a slaveholder in Virginia in the middle of the nineteenth century when agriculture with slave labor had reached its lowest economic ebb and abolition sentiment was rife. It will be recalled that John Randolph of Roanoke vehemently exclaimed in the House of Representatives that the time was soon coming when the masters would run away from the slaves and be advertised by them in the public papers.

At the threshold of our enquiry as to government ownership of the railways, it is meet to ascertain why that step has been taken by those nations which have taken it, and it is curious that no two of them have taken it for the same reason, which seems to indicate that there is no deep underlying principle which demands it.

Bismarck planned to acquire the German railways for the German Empire as part of his scheme of political unification; after being committed to the policy, he acquired them for Prussia, and accomplished his political object indirectly. The Swiss and the Belgians took over their railways because they feared the domination of foreign capital. Italy and France were both compelled to the step as a consequence of original subsidies and to solve otherwise inextricable complications about government control of rates. The Australasian commonwealths built their own railways because the capital could not be secured except on the credit of the state, and, having built the lines, they assumed in the first instance to operate them. Perhaps the history of this last experiment will be like that of the state of Georgia with the Western & Atlantic: after some years of operation by the state a private corporation was welcomed as lessee and has ever since continued to manage the property. The other states in the South which have surviving proprietary interests in their railways have always been content with private operation, *e. g.*, North Carolina with the North Carolina Railroad, and Virginia with the Richmond, Fredericksburg & Potomac; as is also the case with the Cincinnati Southern, which belongs to the city of Cincinnati.

We can find no guiding precedent among these instances. None of them fits the present situation of the United States as a whole.

If, then, there is no other argument for government ownership than the interest of the public, it may be answered that the interest of the public can be, and will be, and indeed is, protected by regulation. The interest of the public in the railways lies in three things: honest management, efficient service, and reasonable rates, without undue discrimination. None of these things would be promoted by government ownership, but are now secured through regulation.

Under existing conditions it is confidently claimed that railway management is honest, whatever may be said of the past history of the railways in the control of those eponymous financial heroes of the tribe of Capt. Kidd and Blackbeard, whose sins, committed during the period of construction or merger of the railway systems which bear their names, were as scarlet as they were picturesque. But the management of the railways of today is not in the hands of pirates. That tribe is as extinct as the great auk, and while their example, like that of Clovis to the later Merovingian Kings, has been responsible for some lamentable instances of vulgar crime among a few unworthy railway officers, it can fairly be said that no department of the government can boast a body of men higher minded, better equipped or more scrupulous in the public service than the men in responsible charge of the railways today. They have mostly risen from the ranks and are the product of years of sound discipline in subordinate positions, so that they know the responsibility of command and at the same time can respect those subject to their orders. They represent indeed that high ideal of intelligent workmanship so eloquently described in Ruskin's fine exordium:

"To obey another man, to labor for him, yield reverence to him or to his place, is not slavery. It is often the best kind of liberty—liberty from care. The man who says to one Go, and he goeth, and to another Come, and he cometh, has in most cases more sense of restraint and difficulty than the

man who obeys him. The movements of the one are hindered by the burden on his shoulder, of the other by the bridle on his lips: there is no way by which the burden may be lightened, but we need not suffer from the bridle if we do not chafe at it. To yield reverence to another, to hold ourselves and our dislikes at his disposal, is not slavery: often it is the noblest state in which a man can live in this world."

Never was character at such a premium in the railway service at it is today.¹

Power in the hands of the individual is always a possibility of tyranny, and the power of the American railway manager is indeed great; not so great as it used to be in the days before regulation, but it is still sufficient great to compensate for some of the difficulties which hamper his work. Disraeli observed that a leader among the boys at an English public school, a captain of Eton or a prefect of Winchester need never envy the prime minister of England, and that is the feeling of the modern railway manager in the United States. Yet his power is now tempered by regulation, for he must account to public authority quite as much as to his board of directors. He sails between the Scylla of enforced resignation and the Charybdis of indictment; so that practically he is as responsible a public servant as if he held a government commission. It cannot be said, therefore, that government ownership is necessary on the ground of control of the integrity of management.

Nor is government ownership necessary to secure efficient service. It may be doubted whether an American railway operated by government would be as efficiently operated as it is under private management. Despite the recent criticism of the efficiency of the existing regime, Julius Kruttschnitt, himself an acknowledged master of efficiency of railway operation, has stated in his recent Harvard lecture his judgment that, as a whole, the American railways are now, and for many years past have been, operated with an efficiency which is astonishing, and that the public has got the benefit of it. In a striking graphic chart he shows the rates per passenger mile and per ton mile actually collected by the railways during the past fifteen years in comparison with what those rates might have been if they had followed the trend of labor and commodity prices during the same period, and he states his conclusion to be that, by the practice of efficiency methods by the railways, more than seven billion dollars was saved to the public in transportation charges in the fifteen years. For the year 1909 this means a saving to the public of \$2,760,000 every twenty-four hours, or nearly three times Mr. Brandeis' famous million dollars a day.

The natural initiative of the American man of business working under the stress of competition leads him to experiment with new devices and adopt new methods from day to day in a way impossible to a government-managed industry. Concentration of responsibility is necessary for this, and the criticism of all government-managed railways in Europe is their rigidity. The individual officer may be fit but he is tied fast with red tape, in a way quite familiar to every one who has done business with

¹Since this paper was prepared I have seen the following extract from a recent leading editorial in the *New York Sun*, and I am proud to know that the author had in mind some of the ornaments of the railway service: "The country needs men especially trained for the administrative responsibilities of business, men who have studied general, social and economic laws as well as the technicals of a particular industry. Their horizon must be wider and their grasp must be broader than that of those whose view is limited by the immediate balance sheet. There are such men now. They are being developed by the corporate regime, and the time will come when no man will be considered fit for the leadership of a great business who does not combine so-called business ability with economic grasp. When that time comes there will be needed no less than now not only trained leaders of industry and commerce, but trained leaders of finance. That the day of the greedy inflationist and conscienceless promoter is passing is evident. The leaders of finance of the future will develop in higher degree the qualities possessed by the greatest of the bankers of today. They will not be concerned with immediate profit, no matter what the future cost in social discontent, but they will have their minds upon the maintenance of that social condition in which the return to the wage earner, to the man who designs and directs, and to the savings of the man of thrift, will be kept as nearly in equilibrium as the fluctuations in the underlying conditions of nature will permit. The great leaders of finance will in increasing degree focus the judgment of the industrial and commercial world for the benefit of those who would securely invest their savings. That character and genuine ability are becoming more and more a potent factor in the conduct of the processes that promote material welfare is proved not only by the elimination of the malefactor from the positions of responsibility in the industrial and commercial corporations, but by the passing of the financial boulder. Ten years ago a profound remark of President Hadley of Yale met with derision from certain quarters, but the course of events proves that the force which works for righteousness is making good his dictum that the surest punishment for the man who has attained so-called pecuniary success through moral obliquity is social ostracism."

the government of the United States. I have myself met, and measured, with the utmost respect for their individual professional equipment, some of the officers of the most criticized railway in the world—the state-ridden Western Railway of France.

The result of government management is almost inevitably bureaucracy, and what this means in comparison with private initiative in living industry can well be illustrated by the experience of Austria. Mr. Pattai, the President of the Austrian Chamber of Deputies, said in a speech delivered last summer:

"We have always been in favor of the state taking over the railways, but if we had been able to foresee the results of the management I assure you we would have hesitated a little longer. We are still in favor of the principle, but it does seem to us that our government has performed a remarkable feat when it has succeeded in creating a deficit on the Northern Railway (which, under private management, earned 6 per cent. dividends). The government have enlisted an army of new employees²; they have gone much too far in the reduction of hours of labor; instead of commercial management they have appointed lawyers to posts that require business men or experts; they have established an entirely unpracticable bureaucracy. At the present moment we are face to face with a deficit of \$25,000,000. There would be no deficit at all if the return from our railways were that which it ought to be.³ I repeat that absolute imbecility has characterized the taking over of our railways. We must introduce business ideas into the government service."

If government ownership and operation is not likely to improve the efficiency of operation, neither is it necessary in the interest of the social uplift. What public opinion, working upon the natural law of competition, does not do in that respect can be and is adequately accomplished by regulation. The modern state concerns itself with many social questions affecting industry without assuming the responsibility of ownership, so today by statute or by order of a commission the railways are scrupulously regulated in the interest of employees as well as the public: safety appliances are prescribed, working conditions and hours of service are modified, compensation for injuries is defined, train schedules are altered or fixed, new stations are built, so-called "full crews" are specified: indeed, it would be difficult to define any act of management in the public interest which the state has not assumed to regulate, for all that the Supreme Court has said that "in no proper sense is the public a general manager" of the railways.

The interest of the public in rates and adjustments of rates is undoubtedly safer under the existing regime of private initiative subject to regulation than it would be under government ownership. The selfish ambition of a part of the public is that rates shall constantly be reduced. Under the stress of competition, and with the aid of improved and cost-reducing methods of operation, the American railways have heretofore constantly met this ambition, and have reduced their rates. Recently they realized that they had gone too far in this process and proposed a general advance in an amount which they considered necessary to compensate them for the additional burden they are now carrying. But regulating authority intervened and the proposed advances were prohibited, the railways being assured that the business of the country was adjusted to then existing conditions and the public interest was such that they must be content. It

is not probable that if the government owned and operated the railways and felt the pinch of fiscal necessity it would be as considerate of the public as it is when it is regulating the management of private property: at least that has not been the experience in those countries where the government has been actuated by such responsibility. In Germany the railways were acquired with a promise that rates would be reduced. After the government got control and found the necessity for increased revenue, it not only did not fulfil its promise, but has since actually advanced the rates.⁴ General advances of rates to provide for fiscal necessities have also been made against the protests of the public on the government-owned railways in Russia, Austria Hungary, Denmark and Switzerland.

W. M. Acworth, the English economist, prescribes two qualifications for a rate maker: expert knowledge and impartiality. He admits that a government officer may have expert knowledge as great as that of the officer of a private corporation, but he denies that the government officer can be as impartial. His argument is worth quoting at length, but it must be remembered that in speaking of a private company he is referring to English conditions where regulation has not gone nearly as far as in the United States:

"Now we agreed," says Mr. Acworth, "that expert knowledge was just as likely to be found in a state official as in the manager of a private company. But from whom are we most likely to secure our second desideratum, impartiality undisturbed by outside influence? Consideration of the normal organization of a private company and of a state undertaking will enable us to supply the answer. Take first the company. The manager of a private company is responsible to a board of directors who represent the shareholders, being, indeed, frequently large shareholders themselves. Their interest is—indeed, it is a common reproach made against them—the dividend, and nothing but the dividend. We may assume that, being ordinary human beings and disliking unnecessary friction, they will sympathize with Turgot's theory that in levying contributions it is desirable to pluck the maximum of feathers from the goose with the minimum of squawking. In other words, their natural tendency will be to support their manager in refusing to shear any individual lamb too close and in getting as much wool as possible from the lamb that can afford to lose it without making it suffer so much that its bleatings will be audible. In the essential positions of manager, directors and shareholders alike there is nothing to induce them unduly to prefer one locality to another, or one trade to another. In the interest of their own undertaking they will not kill a single goose that is either laying golden eggs at the moment, or is likely to begin to lay such eggs in the future. Indeed, if they are intelligent, they will desire to multiply to the utmost possible extent the breed of golden-egg-laying geese. The individual trader at A will naturally object strongly to any adjustment of rates that may enable traders at B or at C to compete in a market where he has a monopoly. But the natural instinct of directors and shareholders will be to support their manager in over-riding this objection, an objection which it is commonly considered ought not in the public interest to prevail.

"So much for commercial management. Now let us see how far impartiality is likely to be secured under a state railway system. At the head of the state railway system there must be in some shape or other a manager responsible to parliament. In other words, a person who is first and foremost a politician, and only in the second place a railway man. Is it reasonable to expect impartiality from a manager of railways with a seat in parliament, a member of a government whose life may come to a sudden end any day unless some important town, or some important trade can be, in American phrase, 'placated'?"

The greatest positive danger of government ownership lies in politics. There are upwards of 1,700,000 men now employed by

²The course of the Austrian government in "enlisting an army of new employees" after taking over the railways was not exceptional. Within three years after the government in 1905 assumed the operation of the railways of Italy the number of employees was increased from 97,000 to 137,000. Critics of the government have attributed this to political influence. The growing demoralization which marked the operation of the roads while this increase of 30 per cent. in the number of names on their pay roll was taking place shows that if additional men were employed to increase efficiency the purpose was not attained. The taking over of the private railways of Belgium by the state was followed by a large increase in the number of employees, and the same thing took place a short time ago on the Western Railway of France, after its acquisition by the government. It has been charged in the Canadian parliament that the government increases the number of employees of the Intercolonial during political campaigns to influence election results.

³Almost the only state railways whose financial results appear to be satisfactory are those of Germany. Professor James Edward LeRossignol contributed an article to *Mcody's Magazine* for August, 1907, in which he showed that after paying interest on the investment in them the New Zealand state railways were operated at a net loss of over \$850,000 per year. The gross earnings of the Intercolonial of Canada in 1909 were \$8,602,986, and its operating expenses were \$9,052,522, leaving a deficit of \$449,536. The interest on the investment in it at 4 per cent. would be \$3,529,279, which would make the total deficit \$3,969,000. A writer in the *Toronto Mail and Empire* estimated in 1907 that the Intercolonial during the previous five years had made a dead loss of \$4,000,000. Allowing for interest on the investment the deficit of the Belgian state railways is estimated by Edwin A. Pratt at \$14,000,000 per year. The deficit of the Austrian railways already has been mentioned. The Russian railways are worked regularly with a heavy deficit. The Italian lines do not earn enough to pay more than one-fourth of the interest on the investment in them. These examples could be multiplied.

⁴The consequence is that the Prussian state railways, which dominate the German system, pay 8 per cent. on the actual cash investment in them. This is twice the percentage of return paid by the railways of the United States on their capitalization; and the investment per mile of the Prussian government in its railways is twice as great as the capitalization of the railways of the United States. There is nothing in the experience of Germany to give encouragement to those shippers who advocate government ownership on the theory that the adoption of this policy would lead to a reduction in the rates they have to pay. The average rate per ton per mile in the United States in the year ending June 30, 1909, was 7.63 mills. The average rates per ton per mile in some of the European countries where the railways are owned and operated by the state are as follows: Switzerland, 17.4 mills; Belgium, 16.8 mills; Hungary, 14.2 mills; Austria, 14.3 mills, and Germany, 12.4 mills.

The effect that political and sectional influences have on rate making by public authorities is shown by Professor Hugo R. Meyer in his book, *Government Regulation of Railway Rates*. Professor Meyer says that these influences cause rates to be adjusted in a way that is economically injurious, and that the German government has had to spend millions on the development of inland waterways, on which rates are made strictly on the principle of "what the traffic will bear," in order to repair the damage being done to the industry of the country by the methods followed in making rates on the government railways.

Elmer Roberts, in an article on German Railway Policy, in a recent issue of *Scribner's*, said:

"German railways, state and privately owned, yet under national supervision, give discriminating rates, grant rebates, treat localities and individuals exceptionally, charge all the traffic will bear under one set of conditions and extraordinarily low rates for other circumstances, employing all the devices condemned and passionately opposed in America, and exercise all the powers of absolute monopoly."

He adds that these things are all done in Germany according to principle of equity. That is what the traffic managers of the railways of the United States have said regarding practices which have been condemned by public regulating authorities, who have then proceeded at once to establish other discriminations which they regarded as based on principles of equity. What are considered principles of equity depends very largely on the point of view.

the railways of the United States earning over a billion dollars a year in wages, and if the government owned and operated the railways they would all become office holders. If we may believe the experience of Belgium and Italy, their numbers might be expected to increase rather than diminish under government management. It is not difficult to imagine what the result would be in practical politics, what pressure there would be upon a party in power for the existing jobs, and for the creation of new ones, a pressure which no civil service could altogether resist.⁶ A well-organized political machine would undoubtedly seek to control, through patronage all railway votes for the party in power, and what this could be made to mean is evident from the mere fact that at the time of the election of 1908 there were over 200,000 more voters in the railway service than the sum of Mr. Taft's popular plurality.

The result of the election in the pivotal state of New York has more than once determined a presidential succession by a small plurality. If the men in railway service in New York could be voted as a unit, as most holders of office under the federal government are now customarily voted, it could not be doubtful how the state would go. Is not this suggestion fraught with real danger to our political institutions?⁷

On the other hand we may consider the compensation which the labor unions might expect for political support. Under the existing regime they have steadily and successfully accomplished advances in wages and modifications of working conditions, which are the equivalent of increased expense to the railways. Is it likely that they would abate their demands upon government when they had the powerful engine of political pressure to supplement their present strength? It is not inconceivable that their

⁶Edwin A. Pratt, in his book *State Railways*, relates many incidents that have happened under government management which indicate what might take place in the United States under that policy. For example, after describing the demoralization of operation on the state railways of Italy after the government took them over he says:

"The fundamental reason for the reign of confusion thus brought about is to be found in the combined influences, the one upon the other, of the railways and politics. Under state operation the exercise of strict discipline over railway servants who are mostly electors, and whose votes are a consideration to be reckoned with by the government of the day, has practically disappeared. It is the railway servants who intimidate the minister of railways, rather than the minister of railways who controls the railway servants.

"In proof of this fact I might allude to the serious railway strikes which occurred in northern Italy at the time the government were proposing to operate the railways themselves. The general manager of the company concerned prosecuted some of the ringleaders; but the government—in order to keep on good terms with the railway men—forced him not only to take these ringleaders back, but even to pay them their wages for the time they had spent in prison, though he would not agree to the latter step until the government themselves found the money. For the foolish concessions thus made by the government, for purely political reasons, they have had to pay by submitting, in turn, and as they might have expected, to the coercion of the men.

"In the height of the present confusion on the lines the minister of the public works, who is also minister of railways, invited the former traffic manager of the Meridionali railways, then district manager of the Milan section of the state lines, to come to Rome, and consult with him as to the best remedy to adopt for overcoming the trouble. The officer in question is one of the ablest and most experienced railway men in Italy. Requested to take over, with all possible despatch, the post of traffic manager of the entire state system, he agreed so to do, disposed of his house in Milan, and made the necessary arrangements for removing to Rome. But when the railway servants heard of what had been done they sent a deputation to the minister to say that if the appointment were persisted in they would all come out on strike. Their objection was, apparently, founded on the fact that the officer was known to be a strict disciplinarian. The minister gave way, cancelled the appointment, and left the officer to go back to Milan and find there another house in place of the one of which he had disposed.

"The example of surrender thus set by the responsible minister has been followed by the heads of departments, so that, in the words of one authority on the subject, 'They are afraid of ordering the railway men about, and the men work as they please.' 'Never,' added my authority, 'has more convincing proof been given of the absolute necessity for the disfranchisement of any large body of workers when the undertaking on which they are employed is taken over by the state. In Italy, at least, though the minister may become a subject of ridicule, he is afraid to risk any prejudice to the political situation, and so he gives way to the coercion brought to bear against him by the very men he is supposed to direct.'"

⁷The political organization of labor in the Australian commonwealth of Victoria had been pursued for some years prior to 1903 and had gone so far that the public service was seriously affected. The aims of the so-called "Trades Hall," composed of labor unions of various kinds, were avowedly as much political as economic; the railway minister ordered the employees of the state railways to sever their connection with it, and the result was a strike of the railway employees. The government, after a bitter fight, won a complete victory, and then in 1906 passed a law which provided that no person employed in any capacity in the public service should either directly or indirectly take any part whatsoever in elections or directly or indirectly take any part in the political affairs of the state of Victoria, otherwise than by recording a vote at parliamentary elections; and that no person or class of persons so employed should directly or indirectly use or attempt to use any influence in respect to any matter affecting the remuneration or position in the public service or himself or any other person. For any violation of these provisions a railway employee or other employee in the public service may be deprived of his position.

success might make profitable operation by government an impossibility. This has been the result in Switzerland.

Having in mind these considerations let us imagine a day with the secretary of the new Department of Transportation.

The secretary has just concluded his first six months of government management of the railways of the United States, but he is not altogether happy in his great office. The statement of the results of the six months' operation which lies before him is only part of his troubles, but that in itself should be enough. In pursuance of the pledge of his party platform on which a year ago he had triumphantly stumped the country, he began his administration by reducing rates. Although business has been fairly good, revenues have shown decreases from week to week from the very start, owing to the reduced rates, and somehow there has not been accomplished that economy which he had proclaimed would come from increasing the wages of employees to the point where their individual responsibility for results would be awakened and high efficiency of labor ensue. This theory had sounded particularly well from the political platform and undoubtedly won many votes, but, while the secretary had done his part and had increased wages in the amount fixed by a board of arbitration consisting of the heads of the various labor organizations, somehow the resulting efficiency was not forthcoming and the operating income was steadily less. The secretary sometimes suspected that his managing organization was responsible for this, because on his coming into office he had reduced the salaries of all the general managers, in response to congressional criticism of the payment of higher salaries to railway officers than were paid to cabinet officers, and as a result most of his competent operating officers had resigned—"to engage in other business," the circulars read. The secretary had heard that this had happened in Switzerland also and had never been quite comfortable in replacing the general managers, who had been born and bred on the road, by lawyers with political pull who were recommended by their Senators.

So the secretary had determined on a reaction and had made several advances in specific commodity rates. This morning he was greeted from the top of his mail by a clipping from a Chicago newspaper denouncing this action, vocally accusing him of graft and demanding his immediate resignation. This was accompanied by a pleasant and clever cartoon depicting the maxim of Philip of Macedon that any fortress can be taken which can be reached by an ass laden with gold, and in this case the fortress was labeled with the secretary's name and its turrets aptly resembled the secretary's peculiar ears.

Further down in the mail was a letter from the Board of Trade of Liverpool demanding the export bills of lading issued by station agents shall be personally endorsed by the president of the United States: a protest from a G. A. R. post against the secretary's new system of scientific divisional organization because it was modeled on that of the Confederate army: a resolution of Congress calling for information as to the movement of switch engine No. 999 from roundhouse to shop without a "full crew," and the all-steel caboose equipped with drinking water as required by the act of such a date: a protest by the federal water-ways commission against reducing rail rates in competition with the water rates obtaining on the rivers recently canalized by the government,⁸ a letter from the department of the interior demanding the concessions from published freight tariffs, on supplies shipped to Indian agents, which that department was wont to demand of the railways before the government took them over; and finally a communication from the post office department advising that as the mail was running normally heavy the usual quadrennial weighing to determine mail pay would be postponed until the department should determine that it was more to the interest of the department to have it done.

⁸The French government strictly enforce a rule upon both privately owned and state railways requiring them to make their rates 20 per cent. higher than the rates of competing waterways, it being considered necessary to maintain this differential to keep the railways from attracting the traffic from the waterways. The policy of making the railways keep their rates higher than those of competing waterways also obtains in Germany, Belgium and other European countries.

Having read these pleasant and encouraging missives, the secretary turned to receive his assembled visitors.

First, there was a delegation from a labor union, accompanied by a United States senator, to demand the removal of the only efficient general manager left in the service (who for very love of the work had remained despite reduced pay), because he had ventured to close his shops when his appropriation was exhausted. Next was an influential member of congress from one of the slum districts in New York, who had a reputation as an authority on political economy and represented the ultimate consumer. He wanted to know whether the generally expected deficit in the income account of the government operated railways was to be met out of general funds of the government and so fall upon the taxpayer at large: he argued, and the secretary could not but recognize the force of it, that this was but another form of special privilege similar to the protection by customs tariff which had weighed upon the country for so many years and only recently had been removed; the reduction of rates for the benefit of the shipper with the effect of creating a deficit to be made up by the taxpayer was, he urged, worse tyranny than Schedule K itself.

The secretary then turned with a heavy heart to delegations from the chambers of commerce of Boston, Seattle and Atlanta, who came to enquire whether the secretary did in fact contemplate, as had been announced in the press, the introduction of the zone system of rates which is in force in Germany, for if so they all wanted to protest (on different specifications it is true) against wiping out the existing systems of rates, based, it was admitted, on apparent discrimination between localities, but they urged that they had done business on those rates for a generation and surely the secretary did not wish to bring on an already nascent panic by throwing all established business into chaos⁹; the secretary was too practical a patriot to do that.

The secretary sighed, and with pure intellectual relief, greeted a group of new and ambitious congressmen who wanted information on which to formulate the annual pork barrel bill for new construction of unprofitable branch lines to all county seats. At least the secretary could sympathize with that: it was practical politics.

Last came the bureaucratic purchasing agent, and, with a complacent smile, reported that he had requisitions for one dozen fountain pens and could save three cents apiece on their cost if authorized to purchase five years' supply. This was the last straw, the secretary exploded, rehearsed the experience of Moses with the green spectacles in the Vicar of Wakefield, and went home to lunch.

The proposal that the government shall acquire and operate the railways is essentially an economic, a business question, but it must be decided in political debate. One is nevertheless encouraged to believe that the American people will, when called upon to do so, decide it right, because the most important and the most difficult economic question of this generation, that of the gold and silver standards, was determined correctly by popular vote in a fierce political campaign. That was a supreme evidence of one of the qualities of our civilization which a stranger cannot always understand. We live in an age when everything "progressive" seems to be considered sacrosanct, when the American people seem to want to change institutions for the mere sake of change, yet in the last analysis sober judgment usually prevails. It is confidently expected that no such violent economic revolution as the taking over of the operation of the railways by the

⁹One of the immediate risks of government ownership, and indeed of any form of government rate-making as well, is the mere substitution of a new basis of discrimination as between localities for that found to exist. In Germany this dilemma drove the government rate-maker, in the beginning, to an automatic distance tariff.

Herr von Miquel, the Minister of Finance, stated in the Prussian Diet in 1894 "that it would prove impossible to retain the state ownership of the railways in Prussia unless it should be practicable to make rates in accordance with hard and fast rules." * * * "It would be impossible," he said, "to make rates for particular occasions to meet the needs of those occasions: for rates made in that manner were arbitrary, and exposed the government to the suspicion and to the open charge of favoring one district or trade and handicapping another." It is an interesting fact that, as pointed out in a previous note, the German government has not been able to maintain this hard and fast rule, however comfortable it may be for the bureaucrat.

federal government will ever get beyond the realm of debate; but, perhaps, even to debate it brings us within the shrewd comment of an intelligent observer in a recent English review:

"A passion for reform has seized the American people," says A. Maurice Low, "and not to take part in the work of reform burdens their conscience. Not to hear the still small voice of reform is to be guilty of mortal civic sin."

"The historian of the next century will wonder what it was all about. The historian of the present century is equally puzzled to find the logical explanation. The historian that is to come will learnedly prove that the American people in the beginning of the twentieth century were suffering under an intolerable burden, that, sunk in sloth, they had permitted themselves to be robbed of their rights and at last rose in rebellion and were fired with a mission of reform. The perspective of a hundred years may enable a more correct view to be obtained of social conditions than we can get today living in the midst of them, but the *raison d'être* for this hysterical wave of reform that is engulfing a sober and intelligent people defies discovery. The Americans were never so well off as they are to-day, their future never appeared so bright, and yet they are discontented, frightened of themselves, fearful of what fate has in store for them."

SUBSTRUCTURE OF THE KENTUCKY AND INDIANA BRIDGE.

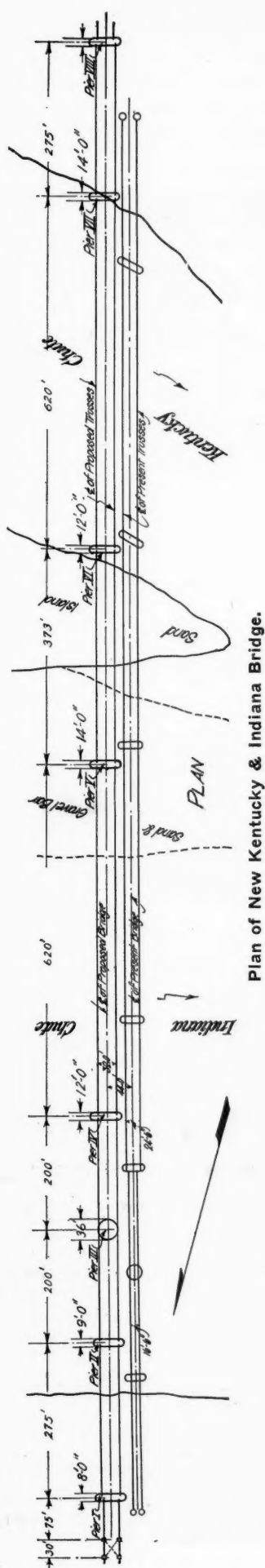
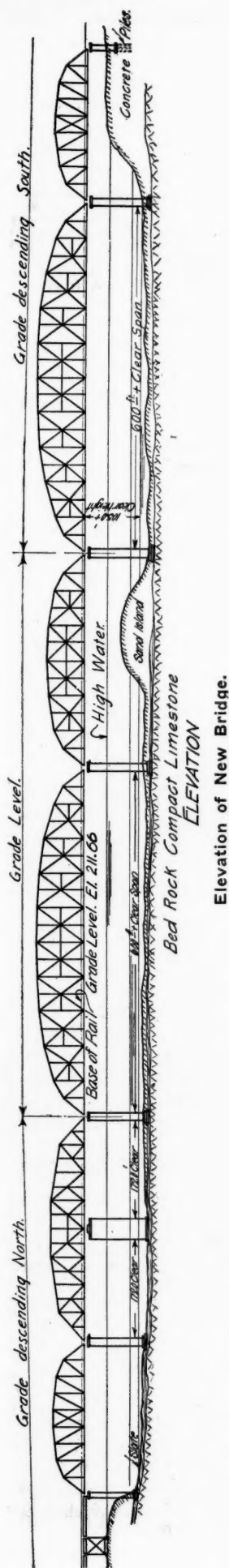
The Kentucky & Indiana Terminal Railroad Company has about completed the substructure for a new bridge across the Ohio river, connecting New Albany, Ind., and Louisville, Ky., and the erection of the superstructure will begin at an early date. The old bridge is a single track structure designed for train loading equivalent to about Cooper's E 24, and was opened for traffic in 1886. It is used by three steam railways, the Southern, the Baltimore & Ohio Southwestern and the Chicago, Indianapolis & Louisville, and by an electric line connecting Louisville, and by an electric line connecting Louisville and New Albany. There are about 75 steam train movements and about 96 electric car movements over it each day. The steam and electric tracks are gauntleted. It is very difficult to operate this heavy traffic over the single track, and heavy rolling stock can not be moved across the bridge on account of the restrictions in loading.

The new bridge will be a plain truss structure carrying double tracks gauntleted for steam and electric traffic between the trusses



Old Bridge, Showing Temporary Turnouts on Highway.

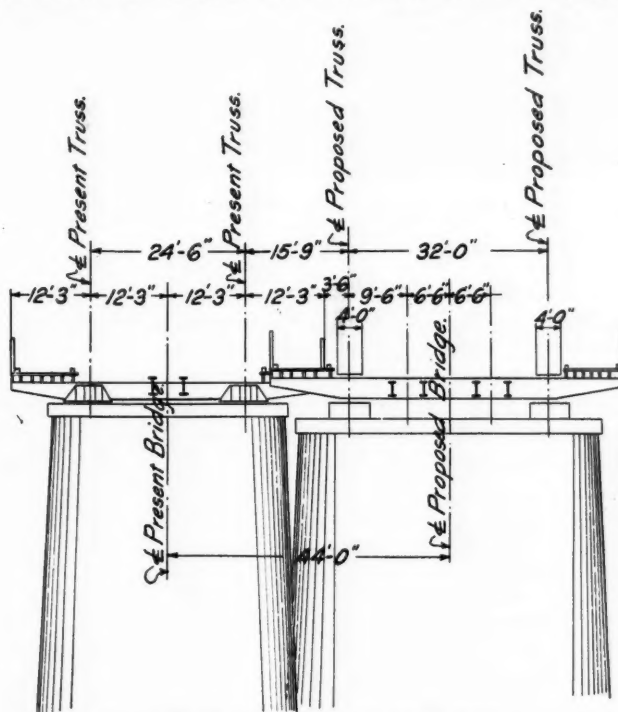
and a highway outside of each truss supported on a cantilever bracket. The alinement is changed enough to allow the new bridge to just clear the old structure, which will continue to handle the traffic during construction work. The accompanying elevation of the new bridge is exclusive of approaches. The choice of span lengths was limited by the requirements of the government that two channels of 600 ft. clear span be provided for ordinary river traffic, and a swing span for traffic which cannot pass under the structure. The river is divided into two channels at the bridge side by a flat island known as "Sand Island." During low water stages the river boats use the government canal, the lower end of which is just above the site of the bridge. This canal connects with the Kentucky channel so that during these periods practically all traffic uses the south or Kentucky shore channel. During high water stages the river



Plan of New Kentucky & Indiana Bridge.

traffic goes directly over the dam at the upper end of the government canal and uses the north or Indiana shore channel to pass Sand Island. The swing span provides two clear channels 172 ft. wide. The south approach is 1,281.3 ft. long, and is a steel viaduct on concrete pedestals, except at the crossings of streets and alleys, where deck girders rest on concrete abutments. The north approach is about 700 ft. long and consists of a fill 550 ft. long and a 150 ft. deck truss supported by abutment III and pier I. The fill includes a deck girder span over the tracks of the St. Louis division of the Southern Railway.

Piers I to VII, inclusive, are carried down to solid rock, and pier VIII and abutment III on the Indiana side are supported on concrete piles. All piers and abutments are of mass concrete. The typical pier has two base courses each 5 ft. thick stepped in 2 ft. all around and the body of the pier is battered $\frac{1}{2}$ in. to the foot on all sides. The pier noses are semi-circular without protection plates. The concrete in the body of piers and abutments is a 1:2½:5 mixture and in bridge seats 1:2:4. The only reinforcement used is placed 4 in. from all vertical faces down to one foot below the minimum low water level and in a horizontal



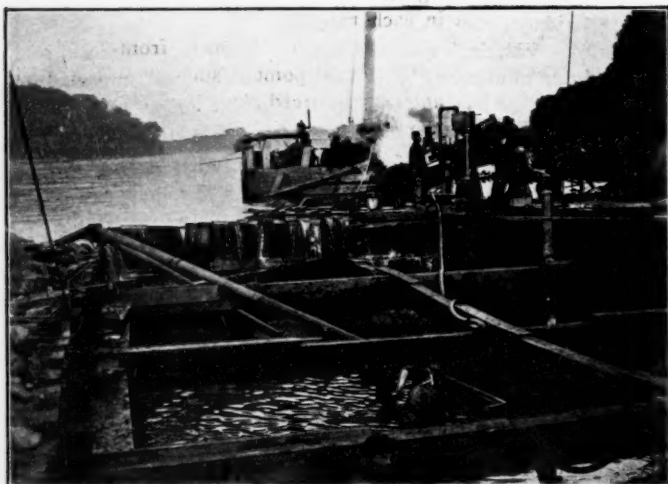
Cross Section of Old and New Bridges.

plane below the bridge seats. This reinforcement consists of $\frac{3}{4}$ in. bars spaced on 15-in. centers and wired at all intersections. This surface reinforcement has effectively prevented surface cracks and the appearance of the finished work leads the engineers in charge to believe that the means adopted for this purpose were fully justified.

The foundation for piers I to VI, inclusive, were laid in puddle coffer dams about 34 ft. by 74 ft. in size. The forms for these coffer dams were made of yellow pine, and were built up in sections on the shore and carried out on barges or floated to place if the water conditions were favorable. The thickness of the puddle wall varied from 6 ft. to 10 ft., the general rule being that the wall should have a thickness equal to the depth of the water in which it was placed. Exceptionally good clay for puddling was available on both shores, its quality being evidenced by the fact that in one case a dam was finished and pumped out in the afternoon and allowed to stand over night with a resulting rise in the water level of less than $\frac{1}{8}$ in. A 6-in. and a 10-in. centrifugal pump were used in each coffer dam to keep out the water, and in the cases where gravel overlaid the rock they were also used to excavate this material. In some of the pier locations slate was encountered which was blasted out and removed with

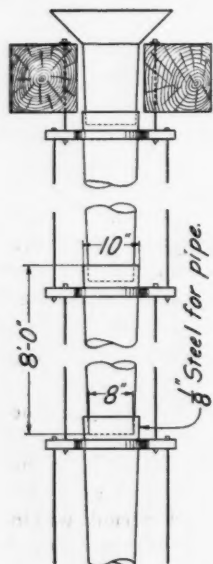
shovels. As the excavation progressed the dams were braced with heavy timbers in both directions.

The coffer dam for pier VII was made of steel sheet piling on account of the fact that the depth of material overlying the rock was considerably greater than in the other piers. A special type of piling designed by H. M. Gould, a member of the firm of contractors doing the work, was used. This piling consists of standard channels driven with the flanges overlapping and with

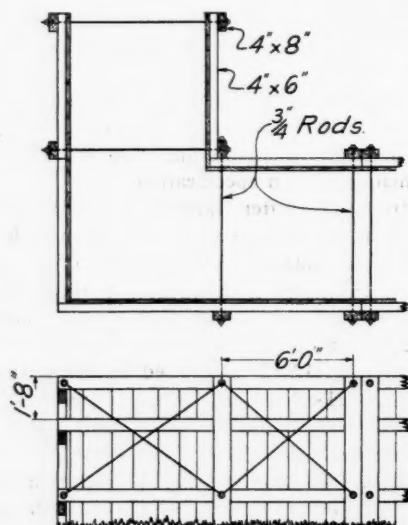


Excavating by Pumping Sand and Gravel in Cofferdam VII.

timbers bolted in alternate channels to furnish water tight joints. The wood is covered by a $\frac{1}{4}$ -in. plate and bolted to the channel before driving. The sealing of the joint is effected by the swelling of the wood after it has been in the water a short time. This coffer dam was 33 ft. by 75 ft. in size, and the piles were 20 ft. long, making a total area of piling of 4,320 sq. ft. The cost of materials and fabrication was \$2,740 and of driving \$730, or a cost of 63.5 cents per sq. ft. for the former and 16.9 cents per sq.



Steel Concrete Chute.

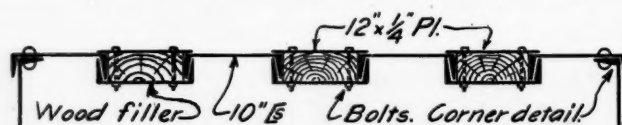


Sectional Forms for Puddle Dam.

ft. for the latter, making a total cost of piling in place of 80.4 cents per sq. ft.

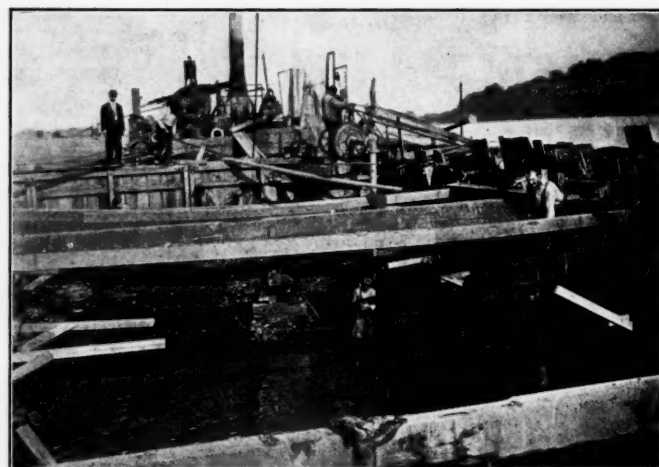
The concrete work was handled from two plants, one located on each shore, the layout and operation of which were practically identical. A storage bin with a capacity of six carloads of stone and another with a capacity of three carloads of sand were provided and a standard gage track was laid on a trestle approach over these bins, so that the material could be dumped directly from cars into the bins. These storage pockets were elevated

enough to permit the dumping of the aggregate into charging cars running on a longitudinal track below the bins, and these cars were arranged to feed directly into the charging hopper of a No. 40 Ransome mixer. A storage house for cement was provided adjacent to the sand and stone bins. The hoisting engine was located in such a position that it could operate the small



Gould Steel Sheet Piling.

charging cars, and could also be used to move standard cars of sand or stone on the trestle. The mixer was dumped into a one yard automatic hoisting skip, supported on a vertical tower which rose above the level of the old bridge and was adjacent to it. The skip was dumped into a hopper at the upper end of the tower which had a capacity great enough to permit the steady operation of the mixer independent of the regularity with which the concrete was taken away. All highway traffic on the old



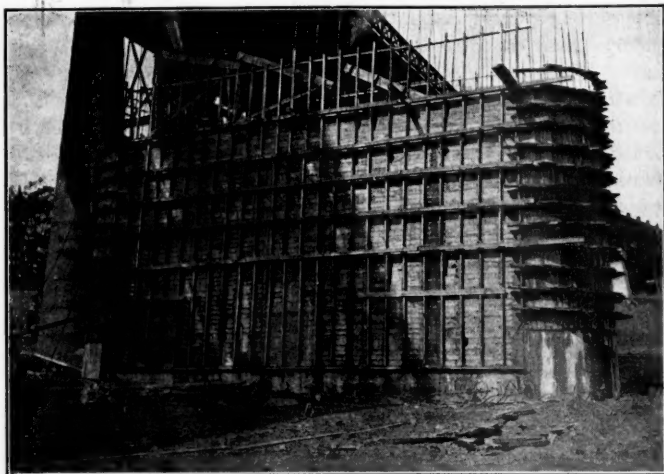
Puddle Cofferdam at Pier IV.

bridge was diverted to the roadway on the side opposite the new bridge and the adjacent highway was given over to construction purposes. A narrow gage track was laid on this highway and one-yard push cars operated on it to carry concrete from the hopper above the mixer to the point where it was to be placed. Concrete was dropped directly from these cars into the forms through wrought iron pipe $\frac{1}{8}$ -in. thick, made up in 8-ft. sections, each section being tapered from 10 in. in diameter at the upper



Placing Concrete in Pier VII.

end to 8. in. in diameter at the lower. These pipes were supported by $\frac{3}{4}$ -in. rods connecting a bracket riveted around the pipe near the upper end of each section to a similar bracket on the section above. The top section was supported directly on timbers resting on the floor system of the old highway. These pipes were suspended from points directly over the center line of the new piers so that very little flexibility in the direction perpendicular to the axis of the pier was required to place the concrete.



Pier I.

The pipe was perfectly flexible in the other directions and no difficulty was found in carrying the lower end of the pipe out to the farthest point on the pier. In some cases a little greater flexibility in the direction perpendicular to the pier axis would have made the work easier, and it was suggested that this could easily be secured by making the supports of the top joint chains instead of stiff rods. Concrete was dropped through these pipes from a maximum height of 115 ft., and the results have been very satisfactory. There was no separation of the aggregate apparent, in fact, concrete deposited in this way seems to be fully as uniform as concrete placed in the usual manner.



Abutment I.

The center pier under the swing span is circular, having a diameter of 30 ft. Concrete was placed in 5-ft. lifts, the ribs supporting the forms being wired diagonally across the pier and no exterior bracing being required. In placing the lower courses it was noticed that this type of bracing distorted the circular form of the pier slightly on account of the tendency for the ribs to bulge between the points where the wires were attached. To overcome this tendency six rails were set vertically in the concrete, being spaced equi-distant from the center of the pier and

from each other. Three wires were run from each rail to the three nearest points where the circular ribs overlapped. The tops of the rails were wired securely, insuring their remaining in the correct position, and the wires from all the ribs in one lift were attached near the bottom of the rail, which left the center of the pier more open than with the former method of bracing, allowing men greater freedom in placing the concrete. This method of bracing proved very effective and the circular form was perfectly retained. The supporting ribs were placed on 12-ft. centers and 19 sections were used in each ring.

The approach fill on the Indiana side is made from the highway of the old bridge which at that point is supported on a steel viaduct. Extra bents and a reinforced floor system were provided to carry two standard gage gauntleted tracks on this highway for construction trains, the object in laying two tracks being to get as great a lateral range for dumping as possible. No attempt will be made to salvage the steel trestle as it was thought to be cheaper to use it to fill from than to build a temporary wooden trestle adjacent to it for that purpose. After the fill is completed the steel that remains above the grade will be torched off and scrapped. The filling is obtained about four miles away on the Chicago, Indianapolis & Louisville, and is handled by contract in Western air dump cars.

The entire work of rebuilding this bridge is being done under the direction of W. M. Mitchell, manager and chief engineer of the Kentucky and Indiana Terminal Railroad Company. J. E. Greiner and J. M. Johnson are consulting engineers, and James B. Wilson is resident engineer. The Foster-Creighton Gould Company is the contractor and Wilbur Creighton is superintendent for the contractors.

PROPOSED LEGISLATION REQUIRING STEEL PASSENGER TRAIN CARS.*

There are pending at present in Congress two bills requiring the substitution of steel and steel under-frame passenger equipment for the wooden cars now in service. The provisions of these bills are, briefly, as follows:

H. R. 5291, introduced by Mr. Esch, of Wisconsin, April 15, 1911.—After January 1, 1912, prohibits construction or use for the first time of any day or passenger coach, mail, chair, smoking or combination car or tourist sleeper for purposes of interstate passenger traffic not conforming to a standard to be designated by the American Railway Association to the Interstate Commerce Commission. Standards to be designated must include certain specifications as to steel under-frame and superstructure. After January 1, 1918, prohibits use of such cars which do not comply with the standards or models provided for. Penalty, \$1,000 for each violation. Does not apply to electric or street car lines engaged in interstate passenger traffic. Interstate Commerce Commission may, after hearing and for good cause, extend period of compliance.

H. R. 11,822, introduced by Mr. Talcott, of New York, June 17, 1911.—Prohibits use of passenger cars after June 1, 1915, unless constructed of steel, upon a plan approved by the Interstate Commerce Commission. Penalty, \$1,000 for each violation. Gives commission discretion to extend period within which the act must be complied with upon full hearing and for good cause.

On May 22, 1911, Circular No. 16 was addressed to all the railways, asking for information as to the equipment in service December 31, 1910, and that which had been received since that date, and also that under construction or contracted for. Inquiry was also made as to the number of passenger train cars acquired in the calendar years 1909 and 1910.

Replies to this circular were received from 193 roads, aggregating 234,834 miles, and covering a total of 54,609 passenger equipment cars in service December 31, 1910, and 4,074 cars put

*A bulletin issued by the Special Committee on Relations of Railway Operation to Legislation.

in service since that date or contracted for. Tabulations, based upon these replies, are shown herewith.

Attention is called to the following:

Acquired Total.	Steel.	Underframe.	Wood.
1909..... 2,000	24 per cent.	21 per cent.	55 per cent.
1910..... 3,783	53 per cent.	14 per cent.	33 per cent.
1911..... 4,074	62 per cent.	14 per cent.	24 per cent.
Approximately in Service.	Steel.	Underframe.	Wood.
December 31, 1908.	0.8 per cent.	1.0 per cent.	98.2 per cent.
December 31, 1911.	9.3 per cent.	3.5 per cent.	87.2 per cent.

Based upon some average known costs, the committee has prepared the following table showing the cost of replacing present wooden equipment in steel:

To Be Replaced.	Number.	Average Cost.	Amount.
Postal.....	727	\$11,000.	\$7,997,000.00
Mail and Baggage.....	3,372	10,000	33,720,000.00
Baggage and Express.....	7,162	8,500	60,877,000.00
Passenger.....	27,238	12,800	348,646,400.00
Parlor, Sleeping, Dining..	7,477	22,000	164,494,000.00
Business and Instruction..	749	15,000	11,235,000.00
Motor.....	176	20,000	3,520,000.00
Total.....	46,901		\$630,489,400.00
Annual Interest charge at 4½ per cent.....			\$28,372,023.00

fundamental principle must be recognized in connection with all of these three, but they present themselves in such different forms that separate discussions of them are necessary.

Dead weight which is not a part of the shipment itself takes at least three forms; weight of cars, weight of preservatives, and dunnage.

By far the largest item of dead weight of this kind is the weight of the car in or on which the freight is carried. Different commodities require different kinds of cars: fresh fruits, packinghouse products, etc., require refrigerator cars; live stock, palace stock cars; coal and gravel, gondola cars, and logs, flat cars. These various styles of cars vary in weight, an ordinary box car weighing about 30,000, a refrigerator car 40,000, a stock or tank car 32,000, and a flat car 26,000 lbs. For this reason the amount of dead weight carried for each unit weight (100 bbls. or one ton) may differ. Then, some of these cars can only be used for the transportation of the particular commodity for which they were designed, as chickens in chicken cars; while others, for only a limited number of articles, as for example,

PASSENGER CARS IN SERVICE OR UNDER CONSTRUCTION.

Class.	Number of Passenger Equipment Cars Operated.	Number Roads.	In Service December 31, 1910.			Received Since December 31, 1910, and under Construction or Contracted for.			Acquired in Calendar Year 1910.			Acquired in Calendar Year 1909.		
			Steel.	Underframe.	Wood.	Steel.	Underframe.	Wood.	Steel.	Underframe.	Wood.	Steel.	Underframe.	Wood.
A	501 and upward.....	33	2,499	997	38,198	2,218	352	818	1,668	385	941	403	303	841
B	201 to 500.....	24	295	250	6,873	241	122	84	221	101	168	74	101	139
C	101 to 200.....	17	22	27	2,129	32	68	30	19	3	29	.....	.....	28
D	51 to 100.....	22	80	63	1,459	16	19	10	80	32	52	.....	7	9
E	11 to 50.....	57	31	130	1,386	11	15	31	22	14	31	9	18	63
F	1 to 50.....	40	.....	14	156	1	.....	6	.....	5	12	.....	.....	5
Total.....		193	2,927	1,481	50,201	2,519	576	979	2,010	540	1,233	486	429	1,085
SECTIONS:														
New England.....	7	12	40	4,909	.....	29	14	460	.....	26	197	10	6	120
East.....	69	1,106	354	15,955	.....	1,110	205	68	576	75	203	165	58	164
South.....	29	7	230	4,535	.....	37	180	49	7	34	113	.....	159	90
Middle West.....	25	475	631	8,000	.....	362	84	6	372	347	32	74	114	108
Northwest.....	15	184	72	3,312	.....	208	20	112	120	.....	350	64	62	147
Southwest.....	29	138	129	3,045	.....	47	72	19	90	41	57	24	30	41
West.....	11	480	25	1,800	.....	317	1	1	326	17	49	143	.....	6
Sleeping Car Companies.....	1	525	.....	4,982	.....	409	.....	.....	519	.....	54	6	.....	268
Canada.....	6	.....	.....	3,643	.....	.....	.....	263	.....	.....	178	.....	.....	121
Mexico.....	1	.....	.....	20	.....	.....	.....	1	.....	.....	.....	.....	.....	20
Total.....		193	2,927	1,481	50,201	2,519	576	979	2,010	540	1,233	486	429	1,085
CLASSES OF EQUIPMENT:														
Postal.....	210	111	1,132	.....	298	70	11	.....	138	10	12	46	30	4
Mail and Baggage.....	67	101	3,601	.....	102	64	42	.....	43	41	81	17	16	85
Baggage and Express.....	459	475	7,665	.....	228	125	157	.....	341	106	147	86	154	186
Passenger, Pass. and Baggage.....	1,448	700	28,969	.....	1,311	287	637	.....	830	346	629	276	206	413
Parlor, Sleeping, Dining.....	669	75	7,842	.....	549	27	126	.....	639	35	343	33	22	392
Business and Instruction.....	2	19	816	.....	5	3	6	.....	1	2	14	1	1	4
Motor.....	72	.....	176	.....	26	.....	.....	.....	18	.....	7	27	.....	1
Total.....			2,927	1,481	50,201	2,519	576	979	2,010	540	1,233	486	429	1,085

The committee further calls attention to the fact that, assuming the approximate book value of the existing wooden equipment to be in the neighborhood of \$4,000 for each vehicle, there will be involved ultimately a charge to operating expenses under the classification of accounts of the Interstate Commerce Commission of approximately \$187,604,000.

DEAD WEIGHT AND FREIGHT RATES.

BY J. F. STROMBECK.

Dead weight is that weight which must be hauled by a rail carrier in connection with and to make possible the transportation of freight and the movement of which does not result in an increase of wealth. In other words if "place utility" is not created by the hauling of a given amount of weight, that weight is considered as dead weight. It has sometimes been called non-paying freight, but that term is not well used as will be seen from the following.

For the purpose of this article, dead weight will be considered as of three kinds, viz.: (1) that which is not a part of the shipment itself and is not closely connected with it; (2) that which is a part of the shipment, but not a part of the commodity itself; (3) that which is a part of the commodity itself. The same

a tank car can only carry liquids, and often only a single kind; stock cars, being open and containing noxious odors, cannot be loaded with such freight as is subject to damage by weather or odor; and the necessity of keeping refrigerator cars clean prohibits the loading of many commodities in them. For these reasons a large per cent. of this special equipment is returned empty to the shipping point, and whenever that occurs, the per cent. which is so returned must be considered as dead weight chargeable to the outbound shipment.

Even though, as often happens, special equipment is returned loaded to its full capacity with freight ordinarily loaded into box cars, there still remains an item to be taken into consideration. To illustrate: A refrigerator car having a tare weight of 40,000 lbs. has carried a shipment of fresh meat from Kansas City to Chicago. The car must be returned to Kansas City for another load. As there does not happen to be any perishable freight, needing refrigeration, to be hauled from Chicago to Kansas City the car is loaded back with a lot of non-perishable freight which will not damage the car. This freight, however, could just as well be carried in a box car having a tare weight of 30,000 lbs. Thus there is an item of 10,000 lbs. which cannot be charged against the non-perishable freight, but must be included as dead weight in connection with the load of fresh meat

from Kansas City to Chicago, making the dead weight for that shipment 50,000 lbs. instead of only 40,000 lbs.

Another large item of dead weight, though not as important as the one just mentioned, is preservatives, as ice placed in the bunkers of refrigerator cars, salt, etc. The weight of preservatives carried free varies in different cases and is determined by refrigeration rules. Sometimes, however, preservatives are not carried free of charge, but shippers are compelled to pay the same rate per 100 lbs. on them as on the freight which they accompany. In such cases they should be considered as belonging to the second kind of dead weight, viz., that which is a part of the shipment itself and which is to be considered later.

The third item included under dead weight which is not a part of the shipment are dunnage allowances, etc. When stakes, blocks, braces, etc., are necessary to keep freight from shifting, also when extra lining in cars are needed, deductions amounting to from 500 to 1,000 lbs. are usually made. Likewise, allowances are made for bedding and manure in stock cars.

All of the above are items of dead weight which are not a part of the shipment itself and for the movement of which the shipper does not pay directly. Because there is no direct payment made on this kind of dead weight, it must be taken into account as an item of cost in connection with the transportation of the freight which makes its movement necessary and therefore an increase in the dead weight per unit of freight means an increase in the rate. In the case of the other two kinds of dead weight, the opposite will be found to be true.

That increased dead weight means increased cost of hauling and consequently a higher rate is accepted by everyone, but the method by which the increased cost is determined is subject to severe criticism. This method has been used numerous times by the Interstate Commerce Commission in its hearings, and has also been regularly used by carriers in presenting facts before the commission.

The following illustration is taken from the reports of the commission. The case in question was for the purpose of establishing the relative rates on fresh meat and on cattle from Kansas City to Chicago. The method used was to compare the rate per 100 lbs. on the gross weight determined as follows:

<i>For fresh meat.</i>		Pounds.
Car		36,000
Revenue paying load		21,000
Ice and other preservatives		4,000
Car on return trip		36,000
Total		97,000
Revenue on 21,000 lbs. @ 20c. per 100 lbs.		\$42.00
Less mileage from and to point of shipment.....		10.00
Net revenue		\$32.00
Revenue per 100 lbs. on gross weight 3 cents and about 3 mills.		
<i>Cattle.</i>		Pounds.
Car		26,500
Revenue paying load		22,000
Bedding, manure, etc.		2,000
Car on return trip		26,500
Total		77,000
Revenue on 22,000 lbs. @ 20c. per 100 lbs.		\$44.00
Less mileage from and to point of shipment.....		6.00
Net revenue		\$38.00
Revenue per 100 lbs. on total weight hauled 4 cents and a little more than 9 mills.		

These rates per 100 lbs. on the gross weight were then compared. The trouble with this comparison is that no discrimination is made between the car and the other dead weight on the one hand and the freight on the other. The transportation of the meat and the cattle is a service rendered to the shippers, and for which the carrier receives revenue. This is not true in the case of the dead weight, the hauling of which is merely one of the many items of the freight. The revenue received for carrying the freight is used for two purposes, the payment of direct costs and indirect costs, which include profits. In my previous articles in the *Railway Age Gazette* these two kinds of cost have been fully explained. In the article on "Car Capacity and Freight Rates" it was shown that possible only about one-third of an average rate under average conditions went to pay for the actual

hauling of freight, the rest going toward indirect costs and terminal expenses. What does this mean? It means that when dead weight is taken into account, as in the case above, the carriers are earning just as much on every 100 lbs. of dead weight hauled toward maintenance of way, and other indirect costs as on each and every 100 lbs. of freight. It is very evident that such a method of figuring will lead to unfavorable and unjust discrimination against freight which of necessity requires relatively large amounts of dead weight.

The difficulty here, as was found in the case of car capacity and also with distance, is a failure to distinguish between the direct and indirect costs of transportation.

The only fair and reasonable way to consider dead weight is to determine the relative amounts hauled for units of the different kinds of freight transported, and having done this, to fix those portions of the rates which are affected thereby in the same ratio.

As the proportion of a rate which represents actual cost of hauling is different for different commodities, dead weight, just as car capacity, is a more important factor in some cases than in others. Thus, for commodities taking low rates which are almost entirely used to pay for the mere hauling it is of greater importance than for commodities taking high rates.

When considered in the above way, dead weight which is not a part of the shipment itself loses much of the significance which has been attached to it.

The second kind of dead weight is that which is a part of the shipment itself, and on which the regular rate of freight is paid. While the writer believes that too much importance has been attached to dead weight when not a part of the shipment, he believes fully as much that more importance should be given to dead weight when it is a part of the shipment.

This second form of dead weight takes the form of crates, boxes, barrels, cases, bags, etc., which are required for the safe carriage of the freight packed in them. All so-called "carriers," as for example egg cases, drums, bottles, milk cans, and numerous other articles, both when shipped filled with goods and when returned empty to the shipper, as well as all preservatives and dunnage for which no allowances are made, are also dead weight of this kind.

The carriage of this dead weight is not a transportation service which has value to the shipper in the same sense as has that of the freight. It would not be carried were it not necessary for the safe transportation of the freight which it accompanies. In this respect it is exactly like the tare weight of a car, preservatives, dunnage, etc. It is merely an additional expense in the transportation of certain kinds of traffic.

Some kinds of traffic do not require any dead weight, while other kinds require very much. Of the former may be mentioned lumber, bricks, iron, etc., while a buggy, whose gross weight when ready for shipment is one-fifth dead weight in the form of a crate, represents the latter. Because of this difference in the amount of dead weight necessary for different kinds of traffic it should be taken into account, and in so doing it is again important that a distinction be made between the mere costs of hauling and the other costs of transportation. As the hauling of the dead weight is not a direct service to the shipper, this weight should not be made to pay revenue toward the indirect costs of the transportation, but merely to cover the bare cost of hauling. The freight, on the other hand, must pay enough to cover both of these costs. As it is impractical to assess one rate upon the dead weight and another upon the commodity itself, because of the impossibility of determining their respective weights, a flat rate must be charged on the gross weight of the shipment. This means that the part of the rate on the freight itself which goes to pay the indirect costs should be reduced by the same fraction as the dead weight is of the entire shipment, and that the remaining portion plus the cost of hauling will make a reasonable rate for the whole. An illustration will make this clear. The weight of a crated top buggy is, say, 500 lbs., of which 100 lbs. represents the weight of the

crate and 400 lbs. the weight of the buggy itself. By a comparison with the rate on some other commodity which requires no dead weight it is found that 90 cents per 100 pounds is a reasonable rate on the buggy. Of this rate, 30 cents, let us say, covers the cost of hauling and 60 cents indirect costs. Because the 100 pounds of crating should not be compelled to pay anything toward indirect costs the charges should be:

Buggy, 400 lbs. at 90 cents.....	\$3.60
Crate, 100 lbs. at 30 cents.....	.30
Total	\$3.90

But this method of assessing charges was said to be impracticable; therefore the 60 cents per each 100 lbs. of buggy is reduced by one fifth or 12 cents, leaving 48 cents per 100 lbs., and as the 12 cents deducted from each of the four 100 lbs. makes 48 cents for the 100 pounds of crating, a rate of 48 cents for indirect costs plus 30 cents for direct costs, or a 78 cents total rate can be assessed on the entire shipment, making the charges: 500 lbs. at 78 cents = \$3.90.

From the above it is seen that if the dead weight is not considered as a mere item of expense in connection with the transportation of the buggy, that commodity is at a disadvantage of 12 cents per 100 lbs. as compared with the article which was said not to require any dead weight. This disadvantage becomes more oppressive when it is remembered that even though proper allowance is made for dead weight, there is an item amounting to 30 cents for the 400 lbs., or $7\frac{1}{2}$ cents per 100 lbs., that must be paid because of the added expense, and in addition thereto is the cost of crating the buggy which the other commodity need not bear.

When empty carriers are returned to the shippers they are of exactly the same nature as the crate of the buggy, and should be carried at the mere cost of handling without earning any revenue toward indirect costs.

The evils resulting from a failure to recognize properly this factor in determining the cost of transportation are brought out by an old, though forcible, illustration. In the case in question, 60 bbls. of oil made a carload shipment of 24,000 lbs., of which 3,900 lbs. was tare weight of the barrels and 20,100 lbs. the net weight of the oil. The 20,100 lbs. represented the transportation service which was of value to the shipper. A competing producer shipped 24,000 lbs. of oil in a tank car at the same total charges as the first shipper did. From the point of view of the value of the service, this meant that if the adjustment of rates was reasonable, the value to the first shipper of transporting 500 lbs. of oil was nearly as great as that of 600 lbs. to the second. The injustice was further aggravated by the fact that the tank car shipper had the dead weight, that is, the empty car, returned free of charge, while the barrel shipper paid for the return of his dead weight. To have brought about full justice due allowance should have been made for the weight of the barrels, and the rate on oil in barrels reduced correspondingly. This was not done. Is it any wonder that the oil business has become monopolized when as important a factor as this has not been recognized in making the freight rates on the products of that industry? While a failure to properly recognize dead weight does not lead to as disastrous results when unlike traffic is considered, the injustice to the freight requiring dead weight still remains, and it is in reality made to bear part of the burdens of traffic which does not require dead weight.

Before leaving this point it should be said that dead weight plays an important part in the determination of carload and less-than-carload differentials. It was shown in the article on "Car Capacity and Freight Rates" that a wrong application of car capacity, which is one form of dead weight, will make these differentials too great. But this is not all. Usually less-than-carload shipments are packed much better than carload shipments, in other words, a larger per cent. of their weight is dead weight. This being true, a failure to make allowance for dead weight will tend to place the less-than-carload shipper—and that is usually the small shipper—at a disadvantage.

Thus the dead weight which is a part of the shipment itself, though not a part of the commodity, should be taken into account as an element tending to reduce the rate on such commodities as require packing for their safe carriage. This is so because the transportation of this dead weight is of no direct value to society, but merely an expense connected with the transportation of the freight which it accompanies, just as is the hauling of that dead weight which is not a part of the shipment.

The third and last kind of dead weight to be considered in this article is that which is not merely a part of the shipment itself, but also a part of the commodity. That a part of any commodity may be considered as dead weight does not at first thought seem conceivable, but a careful consideration of the matter will show that it is not only reasonable, but in fact necessary to bring about justice in certain rate adjustments.

Just what is meant by this class of dead weight is best shown by a specific illustration. In making the best spokes for buggy wheels, hickory logs are cut into lengths somewhat longer than the desired length of spokes to be made therefrom. These lengths are next split into what are known as spoke bolts. These bolts can be either shipped to the wheel factory, hundreds of miles away, in their original form, they can be turned into club spokes, or spokes in the rough, where they are produced and shipped in the new form to the wheel factory, or they can be made into finished spokes and shipped as such to the factory. The process of turning the split bolt into a club spoke reduces its weight materially, and the second process, that of turning the club spoke into a finished spoke, causes a still further reduction in the weight of the spoke. For the illustration, say that the first process takes away two-fifths of the weight of the split bolt, and the second one-third of the weight of the club spoke or one-fifth of the weight of the bolt. The weight of the finished spoke would then represent two-fifths of the weight of the bolt. This last weight is, in the final analysis, the only weight the transportation of which is of value to society. The other three-fifths of the weight of the spoke bolt is dead weight.

This particular form of dead weight is found only in connection with raw materials, and with those which are partly finished, as in the case of the club spoke. From this it is evident that a recognition of it is most important in connection with a fair adjustment of rates for competing localities. Suppose the split spoke bolts be produced at A and the wheel factory at B. The relative rates on spoke bolts, on club spokes and on finished spokes will, other conditions being equal, determine whether the spokes will be finished at A or B. If the rate is the same or approximately the same on all three, there will be a great saving in freight to turn away the waste wood at A and ship the finished spoke, and that is the form the shipments will take.

As was said before, the transportation of the weight of the finished spoke is the only transportation that is of service to society, and the hauling of the dead weight is merely an expense connected therewith. For that reason, this dead weight should be considered exactly the same as that which is a part of the shipment, but not a part of the commodity; that is, the rate on the spoke bolt should be made by determining what per cent. of it is dead weight and then reducing that part of the rate on the finished spoke which is used to pay indirect costs by the same fraction. In other words, the spoke bolt and the finished spoke should pay equal aggregate amounts toward the indirect costs, and the aggregate amounts contributed toward direct costs should vary directly according to their weights. On this basis it will make no difference to the carrier what form the shipments take, for the net revenue earned will be the same in either case, and as the value of the service to society is the same in both cases, this seems to be the most fair adjustment. It gives neither A nor B an unfair advantage over the other. It is true that A has an advantage over B amounting to the actual cost of hauling the dead weight from A to B, but this is an advantage to which that locality is entitled on account of its proximity to the supply of the raw material.

In conclusion it can, then, be said that a clear recognition of the difference between direct and indirect costs is fundamental to a proper application of the element of dead weight in the determination of freight rates. Having recognized this difference in the two kinds of cost, it is found that all dead weight which is not a part of the shipment, and on which the rate does not apply, must be taken into account as a factor in increasing that part of the rate which covers direct costs, while dead weight which is a part of the shipment reduces the part of the rate which goes toward indirect costs.

LETTERS FROM AN OLD RAILWAY OFFICIAL TO HIS SON, A GENERAL MANAGER.*

XI.

CHICAGO, June 17, 1911.

My Dear Boy: Not so very long ago the wife of a passenger conductor, running out of a large southern city, sought the assistance of her pastor, a noted divine. She was worried by the fact that her husband was stealing the company's money. With a good woman's intuition she knew that the wages of sin is death; that sooner or later her husband would lose his job and his family its legitimate income. To her good, old-fashioned, unspecialized conscience stealing is stealing, whether called "embezzlement," "holding out," or "trouble with the auditor." The fearless evangelist shortly afterward preached a powerful sermon against stealing, and included passenger conductors in his warnings. So incensed was the conductor in question that he announced his intention of disregarding the protection carried by the clerical cloth and of knocking the minister down. When the two met his bluff was called. The conductor, not the minister, came to his knees, not in fighting, but in prayer.

Here, my boy, is a canker sore that must be cured. Do not tell me that the Order of Railway Conductors is alone to blame. Do not tell me that in the lodge room the order sidetracks the eighth commandment for the working schedule. Do not tell me that the order will expel a member for any other offense rather than for stealing. Do not tell me that our problem is harder and our revenue less because Ed. Clark, the grand chief of an order thus lawless, was appointed by Teddy Roosevelt to sit in judgment on us from the high throne of the Interstate Commerce Commission. Tell me, rather, that we, the official class, are to blame; that we must cease to dodge responsibility. We, the educated and entrepreneur class; we, the elder brothers of society and industry, cannot shift the burden.

Please do not misunderstand me. There are many honest passenger conductors. I have known them on the road and in their homes. Some there are who deserve the more credit for withstanding temptation because of sickness or extravagance in the family. There are, however, too many dishonest passenger conductors. It is not enough for a man to be honest himself. The complexities of modern life make him more than ever his brother's keeper. He must not only stand for the right but condemn the wrong. The Order of Railway Conductors must make the American people believe that it is a great moral force for honesty in all things. We, the officials, must help the conductors to bring about this happy result.

The clerk for the corner grocer will not steal from his employer as quickly as he will from a large corporation. The existence of a personal employer brings home the moral turpitude by visualizing the individual wrong committed. Coupled with this higher moral incentive is the fear of detection through close personal supervision and interest. In a large corporation we have to approximate to this condition. The corporation, an impersonal creation, is vitalized by the men charged with responsibilities. The problem of organization is to give maximum effectiveness to this vitalization, to utilize to the fullest degree the personal equations of those entrusted with authority. Many railways have

lost control of their passenger conductors because of a fundamental misconception of the principles of true organization.

On the early railways the superintendent was the only officer the conductor officially knew. The superintendent, close to the president, was interested in the revenue as well as the disbursement side of the company's ledger. If the conductor stole, if the returns were short on a day of heavy travel, the superintendent was among the first to know it, and to preserve his own reputation, and thereby hold his own job, promptly discharged the conductor. By and by some conductors graduated into superintendents. This new condition brought a new temptation. The conductor, if allowed to keep on stealing, and if favored with a run where the stealing was especially good, could well afford to whack up secretly with the superintendent. A few, a very few, superintendents yielded to this temptation. Along came the auditor with his mistaken theory that human nature can be changed and men made more honest by being put in "my department." He said, in effect, "take this away from the superintendent, who is dishonest and busy with other things; let this mysterious specialty of conductors' collections be handled by the only honest department." So the superintendent was relieved from responsibility for making his conductors render honest returns. He soon lost interest in that feature. The roads grew, and superimposed above the superintendent came first the general superintendent, and then the general manager, both also relieved from this responsibility to which the auditor clung with jealous tenacity. The conductor probably could not have told what principles of organization had been violated. He was the first to see the easier mark the company had become, the first to profit by the serious mistake that had been made. He found that his reports were checked by office clerks hundreds of miles away and entirely uninformed as to current conditions of local travel. The superintendent and the other division officials who rode with him and knew conditions were powerless to check him promptly and effectively because his reports and returns were going to somebody else over the hills and far away. These officials, because somebody else was responsible, did not seem to care very much. So the conductor stole under their very eyes and got away with it. Anything like this which begets a wholesale contempt for duly constituted authority is demoralizing to general discipline. The labor unions are not alone to blame for the spread of insubordination.

All men are students of practical psychology, whether conscious of the fact or not. The conductor found that to hold his job he must do well those things for which the superintendent and the division officials were responsible. So the bigger thief the conductor became the more careful was he about other duties. He was a crank on train rules, perhaps, or made courtesy to the public his watchword. All of this stood him well in hand. Sooner or later the spotter caught him and the auditor requested the general manager to order his discharge. When this got down to the superintendent or the trainmaster the conductor was called in. Instead of being berated for a thief, if he acknowledged the corn, the conductor was discharged, half sympathetically, half apologetically. The division official would have resented the imputation of harboring or encouraging a thief. To him the conductor was an efficient, faithful employee meeting all requirements of service. If the conductor failed to please somebody else it really must be the fault of that somebody or the system. This feeling was not unnatural, since the detection came through a discredited channel, the spotter. Rare are the circumstances where secret service should be necessary. There is something inherently wrong in any system which has to gain routine information by indirect methods. The detective should not be necessary for checking the good and the bad alike, but only for following up those who become manifestly bad or notoriously corrupt. The most efficient system is that where open checking and inspection are so thorough that temptation is diminished by the ever present thought of prompt and sure detection. This desirable condition cannot obtain where the system makes such important officers as

*Copyrighted, 1911, by *The Railroad Gazette*.

the superintendent and the trainmaster unconscious attorneys for the defense, sometimes openly advocating reinstatement of a thief. On the contrary, from its impersonal nature, a corporation must be so administered as to gain the moral effect of every available force for right, to secure the help, however small, of every person connected with the administration. Views of composite efficiency must converge at a point sufficiently near to be of practical value, not so remote as to be of only theoretical interest. No system is perfect. Under any conditions the very size of a railway necessitates a trifling allowance for speculation which creeps in. This can, however, be reduced to a negligible quantity.

So completely has the old system broken down on most railways—there are a few exceptions—that it has become a farce. It is a sad commentary on organization that many roads are giving the passenger conductor up as a bad job and putting on expensive train auditors who usually are really not auditors, but collectors. They are called auditors probably because they are under the auditor. It is a principle of organization that the staff as such should never command the line. The staff reviews, inspects, audits, studies, advises, suggests and, perhaps, promulgates, but should never execute, except as a representative of the line, the latter being responsible for the results of operation whatever the operation may happen to be. The accounting department is a staff department. When it was given charge of a line function, fare collection, a principle was violated. Ultimate failure of the system was therefore certain and inevitable. The train auditor proposition fails to recognize this underlying cause. It further violates principle, intensifies the evil and wastes more money by increasing the number of staff men doing line work. Its direct effects are vicious and its indirect effects are demoralizing to discipline. How can the young flagman have due respect for his superintendent or other official when he sees the train auditor come to the rear platform and demand to see the pass of the official? If it is an old flagman it is a little hard for him to see why he himself or his friend, the old station agent, might not have been given this new job with its fine pay. Like his superintendent the flagman may have been in the service twenty or thirty years. The train auditor, only last week a country hotel clerk, mayhap, flashes on them both as a would-be superior being from a better world. Neither of the two can become very enthusiastic in helping the train auditor to protect the company's revenue.

It is an awful reflection for the conductors to meet, that, although the railways of this country are now spending hundreds of thousands of dollars for train auditors, they are more than getting it back from increased collections turned in. Is not this more of a condemnation of the old system than a justification of the new? Whether or not the train auditor enters into collusion with the conductor, the former soon learns how easy it is to beat the system. When he does break loose he will be more reckless than the conductor. The latter probably had to work for years as a freight brakeman and a freight conductor to get where he is, and if he loses out may be too old to begin all over again. The train auditor gets his appointment too easily to value it very highly. Off-setting this is the fact that the train auditor is more amenable to some discipline because, as yet unorganized, he can not rely on the support of a labor union to secure his reinstatement. The auditor also has the advantage of examining character from a wider range of selection in choosing his train auditors. The train and engine services have been so badly over-specialized, as I shall show you some other time, that our choice is restricted to men whom the trainmaster happened to hire as extra brakemen years ago. These slight advantages in favor of the train auditor system have been given undue weight. We are all too much inclined to dodge responsibility, to take the course of least resistance and to pass it up to the other fellow. The company pays the bill.

The railways of this country are wasting hundreds of thousands of dollars every year by failure to make the conductors

do their honest duty. I would like to have you immortalize yourself by saving your company its pro rata share of this economic waste. The American people at heart are honest, and barring a few dishonest traveling men who short-fare conductors and train auditors with cash, will in the mass support you and the Order of Railway Conductors in any intelligent movement for honesty. On the other hand, if the people at large get an idea that you are omitting to use all the moral forces at your command they will organize some more special commissions to handle another part of your business for you. Do not let the people get the idea that where passenger fare stealing flourishes, freight claims increase because some freight crews are robbing box cars, and expenses increase because some officials are grafting.

If I were your president I would ask authority of the board of directors, a staff body, to say, as a line officer, to you, also of the line, that as chief operating official you are the only passenger conductor with whom the executive and staff departments will normally deal; that your tenure of office depends quite as much upon your ability to prevent stealing as to prevent accidents. To the auditor I would say that he is responsible for certifying to the integrity of all components of your operations by proper examinations *after the fact*; that he has access to all your accounts and records; that he has no direct authority over any operating men; that all his instructions must be in general terms duly approved by the proper executive. Then he would be a real auditor instead of a chief accountant. We would not have to call in the public accountant to do our real auditing. You would be a real general manager.

Assuming that the proposition is up to you, then say to each division superintendent that he is the only conductor on the division in which normally you will be personally interested; that the conductor will send either the original or a duplicate of every report made by him to the superintendent's office, addressing it impersonally, "Assistant Superintendent." Let the superintendent understand that he and his assistant superintendents when riding over the road on duty at the company's expense must openly check the train just as they check train orders. Pitch it on the high plane of self-evident routine duty for duty's sake, above any thought of underhanded spotting. Give the superintendent as many assistant superintendents and clerks as he may need. Do not let him employ specialists for this one simple component of operation. Have him bulletin train earnings by conductors that the dear women may help the cause by sewing society discussion. Let him have the community understand that some explanation is expected from a get-rich-quick conductor. By this time it will dawn on the superintendent and his assistants that their jobs depend upon the prevention of stealing. Their unconscious sympathy with the thief will vanish. Because they are close enough to the proposition to give practical attention they will prevent stealing.

I am aware that passenger conductors often run over more than one division. This presents no serious practical difficulty, although for many other good reasons also it is better, when practicable, for conductors not to run off the division. Pullman conductors run from their home district over the districts of several of their superintendents.

You and the auditor will have to work out the details as to the necessary bureau in your office, depositaries for money, inter-line relations and numerous other propositions which usually become self-suggesting when the broad working principles are established. You may, perhaps, need another assistant general manager for this work. You will not have the trouble a general manager in Mexico once did. His assistant general manager sold out, it is said, to the conductors. These conductors, mostly Americans, were an enterprising lot. They are also said to have bought the detective agency that was employed to check them up.

On some runs where the conductor is busy with numerous train orders you may find it better to make the head brakeman a collector, but never let him be a specialist independent of the conductor.—Affectionately, your own

D. A. D.

Shop Section.

THE International Railroad Master Blacksmiths' Association will meet at the Boody House, Toledo, Ohio, August 15-17, and the Traveling Engineers' Association will hold its annual convention at the new Hotel Sherman, Chicago, August 29-September 1. Very good programs have been provided, and it is expected that the attendance in both cases will be record-breaking.

REMEMBER the general shop kink competition which has been announced to close September 15. Three kinks are required to enter the competition, and the best collection will be awarded a prize of \$50; a second prize of \$25 will be awarded for the next best collection. Kinks of any kind used in the repair and maintenance of locomotives, cars or other equipment in charge of the mechanical department may be submitted. The descriptions should be made as complete and clear as possible. There seems to have been a misunderstanding on the part of some of our readers as to the preparation of the illustrations. We can use either a photograph, tracing, blueprint, drawing or rough sketch, provided they give a good idea of the construction and operation of the device. Kinks that are not awarded a prize, but which are accepted for publication will be paid for at our regular space rates.

WHAT good did you get from attending the annual convention of the railway association in which you are particularly interested? H. T. Bentley, president of the Master Mechanics' Association, spoke in no uncertain terms of the advantages to be derived from attendance at the various conventions, in his address before the General Foremen's Association. Some executive officers are more or less skeptical as to the value of some of the associations, and we believe that a frank expression from mechanical department officers and foremen as to just how they have been benefited by membership in such associations or attendance at the conventions will do much to make the value of the various organizations more apparent, and to encourage attendance on the part of some of those who have not taken the interest in them that they should. To bring about such expressions we will award a first prize of \$35, and a second prize of \$25 for the best two papers or articles on this subject which are received before October 15. Articles which are not awarded a prize, but which are worthy of publication, will be paid for at our regular space rates.

LAST month we invited our readers to write us newsy letters telling how they had been benefited by the discussions on efficiency and scientific management which we have carried on during the past six months. We have been delighted by the response to the invitation. Several of the letters appear in this issue and others will be used next month. Our main idea in asking for this expression of opinion was to get our Shop Section readers to realize that we would like at any and all times to have them correspond with us about the work which they are doing, or the problems in which they are interested. We believe, if you would take us at our word, that a correspondence department could be built up for the Shop Section which would not only be of great interest, but of real value to the readers. Will you not take us into your confidence and try to help us bring this about? If you have any special problems which you are having difficulty in solving, if you do not agree with statements which appear in the Shop Section, or if you have found that you can solve the problems which are considered to better advantage than by the methods described, write and tell us about it. A minimum rate of \$3 is paid for all articles or letters which are accepted for publication.

FIVE contributions were received in the competition on Reclaiming Scrap Material. The judges have been unable to prepare their decision in time for publication in this issue, and announcement has been deferred until the September Shop Number, at which time we hope to publish most of the contributions.

SHOP SECTION readers will undoubtedly miss the large number of shop kinks which we have been accustomed to publish each month. We have been forced to leave these out because of the amount of space taken up by the two convention reports. However, several kinks accompany the Tool Foremen's report, and a very large proportion of the two reports is devoted to shop practice. Next month we shall resume our regular practice of presenting a large number of kinks in the Shop Section.

A FOREMAN soon gets rusty if he allows himself to become absorbed in the work of his own shop and does not get in touch with what his fellows in other shops are doing. Mr. Bentley, in addressing the General Foremen's Association, told of four ways which the foreman should use to overcome this—visit other shops, attend the conventions, read the best technical papers, and encourage the drummer or supplyman to tell of the good things in shop practice which he has seen in his travels. Attendance at the convention, for instance, he estimated as being equivalent to the earning of six months' salary by working in the shop. His address will be found on another page.

WE desire to call especial attention to the arrangement of the reports of the two conventions which appear in this issue. Shop Section readers are especially interested in both of these organizations, and the conventions of both of them were far more successful than those of last year. In order to give a clear idea of what was accomplished, a considerable amount of time has been spent in abstracting the proceedings of the two conventions and in arranging them in such form that they will appeal to our readers. In the case of the General Foremen's Association, where the discussions, extending over a period of almost three days, covered only two papers, it was necessary to practically rearrange the entire proceedings in order to have the discussions on the different phases of the questions properly grouped.

WE have been taken to task during the past month for not commenting in connection with the competition on how scientific management can be applied to a railway shop on the fact that the efficiency engineers who made the most noise at Washington, and who stirred up the discussion on the subject, did not avail themselves of the opportunity to show that they really meant good when they made the assertions they did and were prepared to show that they were fitted to discuss the question in a practical way. Our reason for not commenting thus was that certain of the efficiency engineers had responded to our invitation to participate in the competition, and had frankly and honestly presented their views. We tried to comment on their contributions in the same spirit in which they were offered. Frankly we were not very much surprised not to hear from some of the efficiency engineers who have been in the limelight in the recent discussion. We have tried hard to find something really new in the various addresses which they have made and in the articles which they have written, which could be applied practically, but have been unable to do so. It is hardly surprising, therefore, that they did not care to enter the competition.

PROPOSED CONSOLIDATION OF GENERAL FOREMEN'S AND TOOL FOREMEN'S ASSOCIATIONS.

THE General Foremen's Association is of the opinion that there are too many mechanical department associations, and that the Tool Foremen's Association ought to consolidate and be absorbed by it. It was only a few years ago that the General Foremen's Association was regarded by some of the higher mechanical department officers as a superfluous organization, and it had to fight hard for its life. It is to be regretted that now that it is giving splendid promise of making good that one of its first thoughts should be to attach and criticise a smaller organization—and that without making a full investigation of the conditions. The only real argument which was brought out in the discussion of the subject was that the tool room foremen were subordinate to the general foremen and that they should, if at all ambitious, train to fit themselves for the higher position by joining the General Foremen's Association. The main idea on the part of the General Foremen's Association appeared to be to swell its own membership list and possibly thereby add to its prestige.

What are the facts in the case? The Tool Foremen's Association, although only organized a couple of years ago and still small in members, has, under the wise leadership of an exceptional presiding officer, demonstrated its right to an existence just as plainly in the eyes of some as has the General Foremen's Association in three or four times that length of time. The tool foremen are specialists, and the tool rooms of which they have charge are the keystones to shop efficiency. Their problems are largely ones of detail, requiring thorough and critical analysis, such as determining the best grinding wheel for certain conditions, or the most efficient design of a tap or reamer. This point will be more clear by looking over the report of the last convention of that association, which appears in this issue. The General Foremen's Association cannot afford to take up its time with these details, important as they are. Its time may be far better expended on the larger problems of shop and engine house management and operation. If it were to devote all its time on these larger problems for several years to come it could not possibly exhaust the subject. Would it pay a tool foreman to come 1,000 miles or more to a convention and spend three days to listen to the discussion of one or two subjects in which he might be interested? Is it not far better to have him spend the three days with men in his own line and in the discussion of problems, everyone of which he is vitally interested in?

If the General Foremen's Association included the tool foremen, how often would the latter be able to get to a convention? It is manifestly impossible for all the foremen to get away at the same time, and the general foreman would hardly step aside in favor of one of his assistants, who would not have nearly as much interest in the subjects which were to be discussed.

There is still another phase to the question. Neither general foreman nor tool room foreman are ordinarily adept in addressing a large audience. Until meeting halls are greatly improved over most of those in which the conventions are held, it will be impossible for the average man to be heard by, or to make himself understood to, many more than forty or fifty of his associates. The average attendance at the meetings of the General Foremen's Association was at least this large. The attendance next year, if the association keeps up its present pace and sticks to business, will be much larger, and the limit of size for a good meeting hall, such as used this year—with maximum efficiency—will have been reached without absorbing any other association. Then too, the interests of the general foremen and the engine house foremen are practically alike. If the general foremen will get busy and make their meetings of greater interest to the latter class of officers, they will not only greatly strengthen their own organization, but will make it large enough numerically to suit even the most ambitious of its members.

A favorite argument against the Tool Foremen's Association

is that there are too many mechanical department organizations, and that the executive officers will soon shut down on some of them anyway. The general managers of our railways will hardly take such a step without making a careful investigation of the facts. One place they will go to look for information will be the published proceedings of the various associations, or the abstracts of the proceedings which are published in the technical papers. The account of the convention of the Tool Foremen's Association elsewhere in this issue will show that it needs to make no apologies for its existence.

RAILWAY MECHANICAL DEPARTMENT ORGANIZATIONS.

THE words harmony, co-operation and efficiency have been worked overtime in railway organizations and the technical papers during the past few years. It almost seems sometimes as if they were used mechanically or parrot like, or that they have become so common they have lost their force. If they have not, and if they are so very important, why have not the clubs and organizations put them into effect in a big way in their own associations? For instance, we have two master mechanical associations—the Master Mechanics' and the Master Car Builders'—and a number of smaller mechanical department organizations which are more or less highly specialized, such as the Traveling Engineers', General Foremen's, Master Painters', Master Blacksmiths', Tool Foremen's, Master Boiler Makers' and Air Brake Associations, and also the Fuel Association, which has much in common with the others.

Each one of these is doing splendid and important work, but they might do even better work if they were to co-operate more closely and combine their forces. This does not mean any loss of individuality, but rather a strengthening of it. The associations would be operated separately, just as they are now, but their executive committees would co-operate or receive instructions from a joint executive committee, or possibly from the executive committees of the M. M. and M. C. B. associations. There is not even a pretense of any such co-operation at the present. The nearest approach to it is that the Traveling Engineers' Association has an official representative at the Master Mechanics' convention every year, and that the first vice-president of the Master Boiler Makers' Association attended the recent convention of the Tool Foremen's Association and made certain suggestions as to how that organization might co-operate with the boiler makers to improve the efficiency of the boiler shop.

H. T. Bentley, president of the Master Mechanics' Association, made an address at the General Foremen's Association last week, and in commenting on the response to his address, said he would be glad to use his efforts to have the executive committee of his association refer certain problems, which it could not find time to handle properly, to the smaller organizations for their opinion and advice. It should not be difficult to bring this co-operation about. In the first place these organizations would undoubtedly be glad to co-operate with the Master Mechanics' Association, for it would add greater dignity to their work, and would be an official recognition of their value. It would also result in more effective work being done, and would add force to such conclusions as might be arrived at.

Good managers have awakened to the fact that a one-man type of organization is not the most efficient by any means. The large problems before our mechanical departments are so numerous that the Master Mechanics' and Master Car Builders' associations cannot begin to consider and analyze all of them, and they should demonstrate their knowledge of good organization by calling upon the other associations and assigning certain specific problems for them to analyze. There is no doubt but that they would take sufficient pride in their work to perform it properly, and if they did not make good it could be referred back with instructions as to why it was not satisfactory. The younger organizations would thus receive the proper kind of

coaching and would improve in usefulness. That they need such coaching in some cases is more or less evident to any one who takes the time to attend their conventions or read their proceedings. Fortunately Mr. Bentley has a reputation for accomplishing things, and there is good reason to believe a new era is about to open in the history of our mechanical department associations.

SIDE LIGHTS ON THE TOOL FOREMEN'S CONVENTION.

IT was interesting to sit at the side of the meeting room in an inconspicuous position, and yet where one could study those in attendance. Not very many, it is true, but truly representative. Massachusetts, Connecticut, Pennsylvania, Georgia, Texas, California, Minnesota, Wisconsin and Michigan were represented with a goodly sprinkling from the states within these limits. But the most interesting thing was the faces. Strong and intelligent features were there—faces good to look upon. One could not but feel that behind those keen eyes and determined faces rested a goodly supply of ingenuity and grey matter. German and Swedish seemed to predominate with here and there a Scotchman or an Irishman—but all American. These men work in a convention just as they do in the shops—studiously, critically and hard—and they get results!

* * * * *

A good example was set which is to be extended next year and which could be followed to advantage by other mechanical department associations. J. W. Kelly, first vice-president of the Master Boiler Makers' Association, was invited to attend the meeting to hear the discussion of the papers on boiler maker's tools, and to speak to the tool foremen on the requirements of the boiler shop in that respect. He told of a number of ways in which the tool foremen could assist in improving the efficiency of the boiler shop. The work of the various departments of a railway shop overlaps and is so intertwined that the extension of this feature should be encouraged, not alone in the Tool Foremen's Association, but also in the other mechanical department organizations.

* * * * *

It is safe to say, in most instances at least, if an article does not give satisfactory results, and the foreman has called the attention of his superiors to it, and to the fact that there is another article or device which is better suited to the conditions, that if his recommendations are not followed, the arguments which he advanced were not forcible enough to make the proper impression. Good executives usually like to have men under them who have the courage of their convictions, and who will intelligently keep at a thing until they get it, or are shown that they are mistaken.

A purchasing agent is primarily interested in prices and deliveries. If he can be shown that a high priced article does the work much better, and considering labor and surcharge, is cheaper in the end, he will undoubtedly be glad to utilize the opportunity of making a saving for his company. To make him realize this is not always a simple matter, and an off-hand or incomplete statement of the facts will hardly do it. Foremen generally should study the art of making clear, comprehensive and forcible reports in such matters. Comprehensive does not mean long, for it is well to have such reports as brief as possible consistent with a clear and logical statement of the facts. Is not the purchasing agent too often blamed more or less unjustly?

* * * * *

The success of an organization does not depend on numbers but upon the spirit which dominates it. Too often the burden of carrying on and developing an organization depends on two or three men. It is therefore necessary to use the utmost care in the selection of the officers. The success of the Tool Foremen's Association has depended very largely on the efforts of a few men, chief among them being M. H. Bray. A year ago the president of the association could not be present, and Mr. Bray, then a vice-president, had to take charge and preside. This he did in

a most successful manner. At the close of the meeting he was elected president; during the year the secretary-treasurer withdrew and Mr. Bray, in addition to his duties as president, had to take charge of the work of that office. That he made a good job of both of these difficult positions was indicated by the increased attendance at the recent convention, by the successful programme which was arranged, by the dignified and yet informal way in which the meetings were conducted, and in the frank and thorough discussion of the various topics. The future success of the association is largely assured by the fact that Mr. Bray has consented to assume the duties of secretary-treasurer for the coming year in order to actively assist in the further development and upbuilding of the organization, and by the election of E. J. McKernan as president. With Mr. Bray in the East and Mr. McKernan in the West and several enthusiastic members throughout the country, the prospects for next year are exceptionally good.

* * * * *

When the association was organized, a couple of years ago, many of us believed that there was very little field for it, and that it was a mistake to add to the already comparatively large number of mechanical department organizations. Careful observation of the conduct of the last convention indicates that not only is there a good field for such an organization, but that the members who were present used the opportunity to good advantage. The subjects discussed were those in which the tool foremen are specially interested, and for which they are largely held responsible for results. Most of the subjects were ones which have not been, and probably will not be, considered by other railway mechanical associations, such as the General Foremen's, Master Blacksmiths', Boiler Makers', etc. Most of the foremen seemed to come with certain problems on their minds with which they were having difficulty, and for which they hoped to find a solution. This fact cropped out again and again during the discussions, as one by one they frankly stated their conditions and asked for information. And in most cases some one of the forty odd men present had solved the problem successfully. This practically means that a road whose foreman attended the convention has in effect, not one but several such foremen. The roads represented are surely going to get good returns from this convention.

* * * * *

The way in which the members decided to frankly compare notes as to the results they are obtaining from different makes of tools or materials which they are using was really refreshing. Obviously, no real progress could be made by "beating around the bush" and not mentioning trade names or referring directly to the names of the manufacturers of the articles under consideration. The manufacturer or dealer should welcome this sort of discussion. For instance, in one case, a man after he got up and told how he had tried a certain article and how it had failed. The impression seemed to be general that this particular product was comparatively useless for railway tool room purposes. Then a member got up and said he had had the same difficulty, but had succeeded in overcoming it by calling in one of the manufacturer's experts and securing his assistance in locating the source of trouble. Then one of the men who had most strenuously objected to the article admitted that the tests upon which he based his conclusions had been made two and a half years ago.

Possibly the same thing was true of many of the others who had had unfortunate experiences with the article, and that had the company furnishing it realized the conditions under which it was to be used it could have modified it to suit them. Frank criticism can do no harm in such cases for it either brings out the fact that the article or device was not properly used or that the manufacturer had not rightly understood the conditions under which it was to be used. If the latter is true or if the article is not suited to the work the sooner the manufacturer learns of it the better. The railway supply manufacturer has been a most important factor in the development of American railways, and just as the railway man is benefited by the frank discussion of

the problems with which he has to contend, so the manufacturer is also benefited. True, the supplyman may not appreciate such a public discussion if his device is not giving good results, yet if the speakers are as frank as those mentioned above it must surely result in good, for it enables him to locate where the trouble is and to find out how it has been successfully overcome.

GENERAL FOREMEN'S ASSOCIATION.

THE General Foremen's Association, judging from certain things which took place at the annual convention last week, is in a fair way to develop into an aggressive and effective organization and to take the position in the railway world to which it is rightfully entitled. Few problems are more important at the present time than those concerning the organization, management and efficient operation of railway shops. The men who are best qualified to discuss and solve these problems should be those who are in direct charge of this work. The General Foremen's Association, like the Master Mechanics' Association, is a little unfortunate as to its name. For instance, the Master Mechanics' Association is dominated largely by superintendents of motive power, mechanical superintendents and mechanical engineers, although it, of course, has a large number of master mechanics among its members. A broader title would describe its membership and purpose far better. While the General Foremen's Association is composed largely of general foremen, the purpose for which it was established and on which its life depends—improved shop and engine house efficiency—means that it must include in its membership all those officers who are directly in charge of shops and engine houses, whether their titles be master mechanic, shop superintendent, general foreman or engine house foreman. It should also be open, and it is, to the foremen of the various departments of the railway shop. For some reason, master mechanics in charge of shops and shop superintendents of many roads have not taken an active interest in the organization, possibly because they feel it is not in keeping with the dignity of their titles. The election of a hustling master mechanic—a real live wire—as president of the association should do much to dispel this feeling.

* * * * *

Practically only one subject was considered at the last convention, and that was shop efficiency. Mr. Pickard, referred to as chairman of a committee on that subject, but really the only member of the committee, had corresponded with all the members of the association and had developed a number of leading questions under the heads of shop organization, accounting and supervision, handling material, and shop kinks and methods. These questions he sent to each member of the association a couple of weeks before the convention with the request that they send or bring with them a written discussion or be prepared to discuss the subject on the floor of the convention. This discussion practically occupied the greater part of five sessions, except for the time taken up by addresses and the report of the shop kinks committee which fitted in so nicely with Mr. Pickard's schedule that it really became part of the discussion of that paper. The scheme is unique, and it worked well. One thing, however, must not be lost sight of, and that is that although only four committees were appointed to report at the convention, two of them defaulted, and that had it not been for Mr. Pickard's ingenious idea the convention might have been in a rather serious predicament. Undoubtedly there were good reasons for these failures. The statement was made on the floor of the convention that in these days an engine failure is regarded as a disgrace. If that is true of such a small thing as an engine failure, should not the members of an organization which has assumed the important duty of considering matters concerning shop output and efficiency be more careful in the discharge of their responsibilities?

There was not time enough to fully discuss the questions in Mr. Pickard's paper, although some few of them were gone into quite thoroughly. It is important, and indeed necessary,

that any question worthy of being brought before the convention should be thoroughly and completely discussed before it is dropped. There are few things which the association can take positive action on in the way of making recommendations, because the conditions vary so greatly in the different shops that what might be good for one would be bad for another. The discussions should be so complete, however, that a foreman listening to them or reading them would know whether the methods in question could be used successfully for his peculiar conditions.

* * * * *

The attendance was splendid, being more than twice as large as that at the meeting in Cincinnati last year. The meeting hall was admirably adapted for the convention. It was much larger than necessary, but the acoustic properties were good and it was removed from the noises of the street and the smells of the kitchen. What little disturbance there was came from the exhibit hall, and with a little forethought that could have been avoided. Arrangements have been made to overcome this difficulty at the Traveling Engineers' convention which meets at the same place the latter part of this month. There were also far more exhibits and they were better arranged than last year.

* * * * *

The men who have been elected to lead the association during the coming year are all progressive and aggressive; they have already organized and arranged their plans. They have taken such a decided stand for better things that their reputations are practically staked on making good and putting the organization where it really belongs—and there is little possibility of their losing out. They have our good wishes, for few associations have such possibilities before them.

MECHANICAL ARTICLES DURING JULY.

THE articles of interest to our mechanical department readers that have appeared in the weekly issues since July 7, and to which the Shop Number readers may wish to refer, are as follows:

Railway Executive Officers and the Supply Manufacturers' Exhibitions. An editorial on the exhibitions at the recent M. M. and M. C. B. conventions at Atlantic City, in which is mentioned the value of these exhibits to the attending railway officials. The railways are urged to send their mechanical and operating officials that they may receive the benefit of such exhibitions. The members of the American Railway Association are urged to take a greater interest in these exhibitions and the work of the conventions. July 14, page 70.

Educational Value of the Atlantic City Exhibits. An illustrated article on the comprehensive exhibits given at the recent M. M. and M. C. B. conventions. There were 250 exhibitors covering a space of 76,110 square feet on the Million Dollar Pier, and even this did not accommodate all those that applied for space. The range of exhibits was very large throughout both the car and motive power departments. Many machine tools were in actual operation showing what may be accomplished in the shop. The whole exhibit was appreciated as much by the higher officers as by their subordinates. July 14, page 73.

Hanna Locomotive Stoker. An article containing twelve illustrations of the application and details of the Hanna locomotive stoker as applied to locomotives. Its operation and construction is considered in detail and with the service results obtained in actual practice the article is made complete. Runs were made with a 906-ton train over a distance of 137 miles, which included grades of from 10.6 ft. per mile to 60.6 ft. per mile. The boiler pressure was held above 190 lbs. during the whole trip, and the firing was done by an untrained man with apparent physical ease. July 14, page 85.

American Railway Tool Foremen's Convention. A brief account of the third annual convention giving a list of the papers presented and a list of the concerns making exhibits. July 14, page 90.

Boiler Inspection Districts. The article contains a map of the United States, showing the fifty districts allotted to the federal inspectors. July 14, page 91.

Mallet Locomotive. An editorial which expresses some opinions or suggestions that are in the air regarding the Mallet compound locomotive. The criticisms mentioned are not of mechanics, but of economics. The limitations of the Mallet are considered and its cost of maintenance is compared with other locomotives used in the same service. July 21, page 108.

Wide Fireboxes. A communication which gives the credit of the first semi-wide firebox to James Milholland, of the Philadelphia & Reading, in

1857, and of the first wide firebox to John E. Wooten in 1877. July 21, page 110.

Electric Switching Locomotive. An article describing the new articulated truck electric switching locomotive recently received by the New York, New Haven & Hartford which will operate in the Stamford yards on that road. This locomotive is a 79-ton single phase machine, with a tractive effort of 36,000 lbs., and is the first of its kind to be used as a switcher in heavy freight yard service. July 21, page 118.

Coupler and Draft Equipment. This is a circular of inquiry from the M. C. B. committee on coupler and draft equipment which includes a table for the different roads to fill out, that the committee may proceed in a comprehensive manner to design a new coupler to meet the new safety appliance laws. July 21, page 120.

Caboose Cars Made From Box Cars. An article which describes the ingenious way box cars are converted into caboose cars on the Wabash. Details are shown of a 34-ft. car. July 21, page 121.

A Practical Demonstration in Fuel Economy. A report of a test made on the Lehigh Valley with a single engine hauling a through train from Buffalo, N. Y., to Jersey City, N. J., a distance of 446.6 miles. The test was made with a view of illustrating to the engine crews on that road just what could be done in the matter of saving fuel. The coal used per passenger car mile on this run was less than a third of the average amount used in the year 1910. The run was made without the fire being cleaned or raked, and the grates were only shaken slightly six times. July 28, page 175.

Observation-Buffer Cars. A descriptive article of recent equipment furnished the Chicago, Milwaukee & St. Paul. The car described is 72½ ft. long and contains an observation room, a writing room, a buffet, a smoking room, a barber shop and a bathroom. The car is beautifully furnished and is made of steel. July 28, page 176.

International Railway General Foremen. A brief account of the program of the convention held at the New Sherman Hotel, Chicago, with the newly elected officers and a list of the exhibitors and their products. July 28, page 186.

M. M. and M. C. B. Committees. A list of the standing and special committees for both associations to act during the year 1911-1912. July 28, page 188.

Letters to the Editor.

EFFICIENCY.

ALBANY, N. Y., July 27, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Several of the correspondents of the *Railway Age Gazette* have mentioned piece work as a panacea for all inefficiency ills. The writer grants that piece work is excellent in some departments. Machine, carpenter and forge shop operations have lent themselves admirably to this treatment on several large roads. But has anyone applied it successfully to the erecting shop? This is the one department whose efficiency, however high, must be reduced by the inefficiencies of all the other departments that supply it with material. If the efficiency of the erecting shop is the actual number of locomotives leaving the shop per week divided by the theoretical number possible, then the plant efficiency is: Erecting shop efficiency multiplied by the average sub departmental efficiency. Assuming reasonable figures for a shop sending out forty locomotives per week, we get:

Machine shop efficiency	= 90 per cent.
Forge shop efficiency	= 85 per cent.
Boiler shop efficiency	= 82 per cent.
Erecting shop efficiency	= 60 per cent.
Average	= 86 per cent.
.60 x 86 per cent.	= 52 per cent. = plant efficiency.

These approximate figures indicate a field in which the efficiency engineers might well direct their efforts.

The writer holds that this great lack of efficiency in the erecting shop can not be remedied by any piece work system that is comprehensive. No scheme can surpass day work guided by competent gang foremen. The gang foreman is the key to the situation. No matter how excellent the general or departmental foremen may be, in the last analysis it is the gang foreman that puts the work through. Personality, knowledge, and daily contact place him in a most intimate acquaintance with his men. He is the one for whom the workmen really work. Make him more efficient and you increase the efficiency of the shops. Following are some suggestions: Select for gang foremen men of attractive personality—men who can and will instruct and influence others. Do not permit them to operate

boarding houses or obligate their men in any way. Keep the gangs small in size and alert. Move the foremen from locality to locality; "familiarity breeds contempt" sometimes between the foreman and the workmen. Have a distinct path of promotion available to progressive foremen. "B. B. B."

BUFFALO, N. Y., July 15, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Probably no other subject taken up by the *Railway Age Gazette* during the past six months has awakened wider interest or created more general discussion than the articles on efficient shop management. We have followed them with keen interest and have given each one considerable thought and study. Undoubtedly the so-called efficiency engineers have been pretty thoroughly jolted in these discussions by the high court of mechanical men all over the country and ought to feel like the Irishman who tumbled into a deep well, and who, when his companion looked over the brink and called to him, "Mike are ye kilt?", replied, "No oim not kilt but oim spachless!"

Seriously, though, the general trend of opinion has been and is now that there is undoubted good in efficiency methods, if they are rightly applied. The efficiency men simply got in wrong. They advanced some good ideas, but did not have the practical experience to back them up and pursue their plans to a successful issue and produce concrete results.

Right here let us express our entire accord with one writer who said in part: "While many a shop superintendent, master mechanic or shop foreman may have no proper appreciation of the beauties of the philosophy of efficiency, may be unable to follow the line of reasoning of the efficiency men, may be mistaken in his belief that his men are more efficient than the assays have shown, and may have much to learn, he has usually reached his position because of certain qualifications possessed in greater measure by him than by the other men with whom he has been associated." These men are performing efficiency "stunts" every hour of every day. In fact they must do it in order to meet the complex problems and overcome the difficulties and produce the results that are not alone required but are demanded in the present day railway shop and engine house.

Here are the real efficiency men, full of experience of the most practical kind. Backed up by education, hard study and that most valuable asset, common sense, and given the same freedom to act as the efficiency engineer, and carte blanche as to the introduction of new methods and making changes that they *know* would add to the facilities and increase the output, would not the shop foreman, shop superintendent and master mechanic become our ideal efficiency men, giving us efficiency that is *really efficient*, and results that will stand any test and any investigation? But too often we hear the story repeated of strenuous effort for a new engine house roof; a brave battle for a much needed new sidewalk; urgent requests many times repeated for some modern machine tools; for high speed steel; for better belting; for electric motors to drive machinery; increased shop room; better facilities in the repair yards; tracks repaired, and so on almost without end. All these things and a hundred others are directly along the line of efficiency and scientific management. Why delegate these improvements to the efficiency engineer, full of high flown ideas, and *high priced too*? An outsider whom we are supposed to look up to with awe and veneration, and bow down to the halo around his head. Rather let us keep these things that are worthy of accomplishment in our own inner circle, seeing and knowing that they are good, and letting the honor and glory rest where it rightly belongs, and adds to the record of the man really behind the gun.

To the writer these articles and discussions editorially and otherwise have been of special interest and value in the matter of measuring up and comparing the various lines of shop management and efficiency methods brought out, and have been helpful in many ways. The entire matter has made a profound and asking impression upon us, and efficiency has been adopted as our watch-word and the gage of our progress. C. C. LEECH.

TOOL FOREMEN'S ASSOCIATION

The third annual convention of the American Railway Tool Foremen's Association was held at the Wellington Hotel, Chicago, July 11, 12 and 13. President M. H. Bray, tool room foreman of the New York, New Haven & Hartford, New Haven, Conn., presided. C. A. Seley, mechanical engineer, Chicago, Rock Island & Pacific, made an address in which he commented on the great increase in the efficiency of railway tool rooms within recent years. The efficiency of the shop as a whole depends largely on that of the tool room, and the tool room foreman should strive to improve the efficiency of his department in every detail. E. J. McKernan, supervisor of tools, Atchison, Topeka & Santa Fe, replied to Mr. Seley, thanking him for his address and his interest in the work of the association. Mr. Bray, in his presidential address, directed attention to the watchword of the association—"Higher efficiency in

hammers, etc., and also the manufacture of dies and new and special tools.

The proper location of the distribution room is in the center of the main shop, at a point convenient to both the machine and erecting shops. The size of this room is determined by the number of tools required for the monthly engine output. The tool racks should be arranged to give the greatest accessibility to the tools; pigeon holes and pockets should be plainly indexed and of such a number as to accommodate every tool. An iron-covered counter should circumscribe the racks and be protected on the outside by a high wire screen. Openings of ample size for handling shop tools should be provided in the screen at points opposite the tools most used. For instance, there should be a window opposite taps, drills and reamers; another opposite dies, wrenches, etc.; another opposite air motors and the heavier

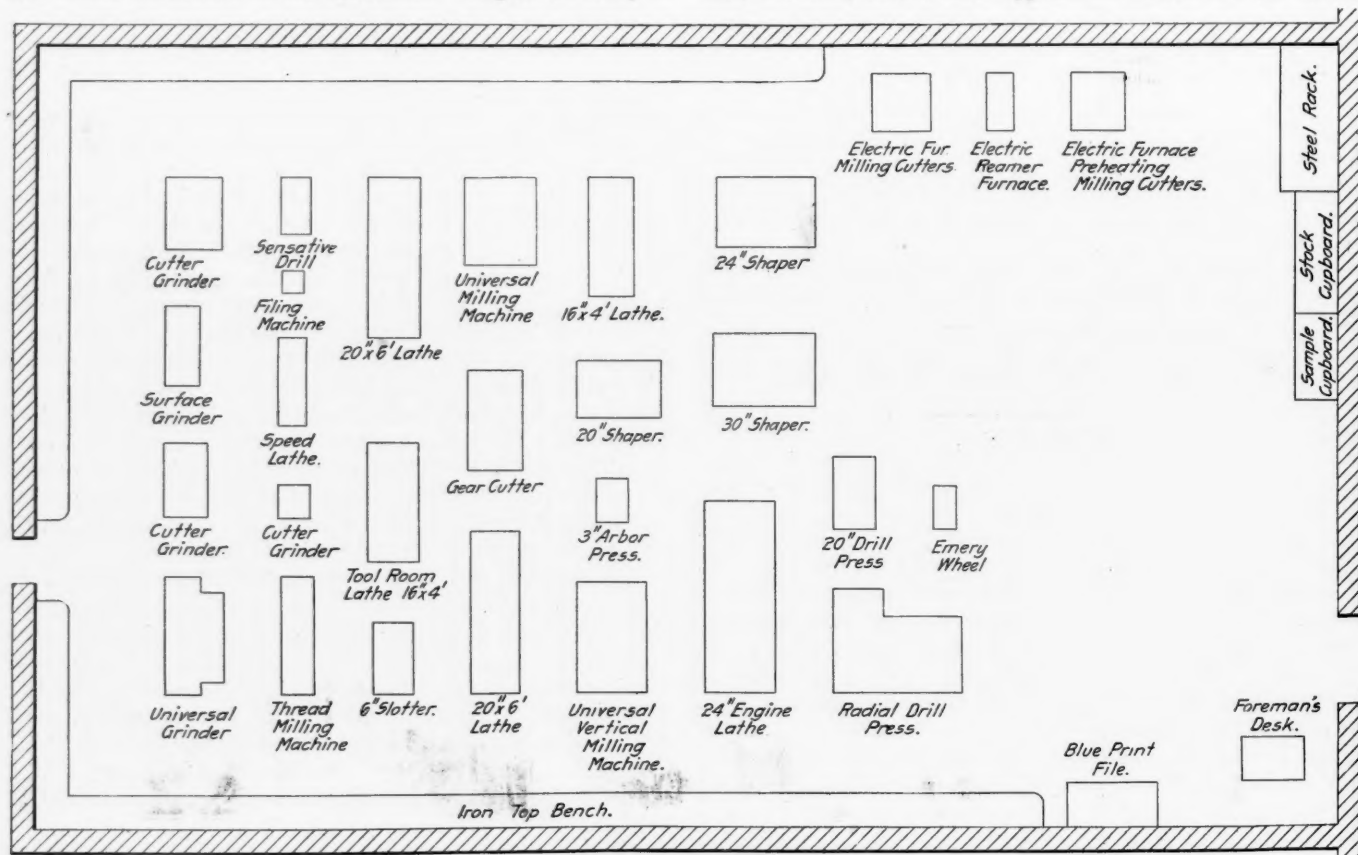


Fig. 1—Arrangement of Machine Tools in an Ideal Tool Room.

railway tool service"—and commented on the splendid growth of the association during the past year.

TOOL ROOM EQUIPMENT.

B. Hendrikson, Chicago & Northwestern, Chicago, presented a paper on this subject, in which he said the proper equipment for a railway tool room is determined by the special conditions of every shop. The number of engines to be repaired and the kind of tools and the extent of work done are factors to be considered in its equipment. The ideal tool room should be so located, equipped, organized and managed as to give the quickest and best repairs to broken shop tools, and to do the most efficient work in the manufacture of new tools, dies and special machine parts. The tool room of a large locomotive repair shop has two functions: The distribution and proper care of small tools for the daily use of shop men, and the repair of machine parts and special tools, such as pneumatic motors,

tools. Such an arrangement greatly facilitates the quick handling of the tools.

The stock of taps, drills and reamers should be of such size that the breaking of a few of the same dimension will not necessitate the holding up of shop work. The damaged tools should be repaired at once and be placed in their proper racks. In the average size shop there is work enough in the grinding of small tools to require the continuous attention of one man, and the employment of such a man is economy. The distribution room should be equipped with a twist-drill grinder, a reamer grinder, an efficient grinder for lathe and planer tools, and a grinder with two 12-in. wheels for general work.

The second function of the tool room—the repair of machine parts and the manufacture of new tools, dies, etc.—is of such importance as to require an especially equipped room. This room should be located away from the noises of the erecting and machine shops in a building annexed to the machine shop. This location prevents night men from trespassing in the search for tools, and the consequent misplacing of important work.

It also provides a quiet place for the careful and painstaking labor of die and tool makers. The room should be so constructed as to give a maximum amount of light and air. The roof lighting system with prismatic glass windows facing the north, together with wall windows, affords excellent lighting.

The machine arrangement in the ideal tool room is shown on the accompanying sketch, Fig. 1, and consists of the following tools:

- 1 24-in. lathe.
- 2 20-in. lathes.
- 2 16-in. special tool-room lathes equipped with taper attachments.
- 1 Speed lathe, 12-in. swing, 5-ft. bed.
- 1 Milling machine.
- 1 Universal gear cutting machine capable of cutting spiral and bevel gears.
- 1 48-in. radial drill press.
- 1 20-in. power feed drill press.
- 1 Sensitive drill for work up to 1½ inch.
- 1 Vertical milling machine.
- 1 Tap milling machine with automatic cutter grinders.
- 1 42-in. universal grinding machine.
- 1 Universal cutter grinder.
- 1 Grinder for two wheels, 16-in. diameter.
- 1 Up-to-date filing machine.

system eliminates the cumbersome shafts and belts and the unnecessary wear on them when the machines are not in operation. It prevents the possible "tying up" of the whole tool room where a main belt breaks, and eliminates the necessity of running the whole shop when the use of only one machine is desired. The direct motor drive allows an absolute independent location of every machine, which is impractical in the belt-driven shop where the best belt arrangement often determines the location of tools.

Benches with iron tops, drawers and locks should be provided for the men; swivel jaw vises should be placed at convenient places on the benches. Cupboards for sample work, and for the filing of blue prints should be provided at convenient places. The ideal tool room is provided with a suitable rack for a light stock of annealed tool steel. Pin racks placed on the walls for milling cutters and emery wheels are very necessary. Cupboards for the proper storing of finished tools should also be provided.

DISCUSSION.

Benches.—Several members objected to benches with iron tops because of the danger of damaging certain classes of

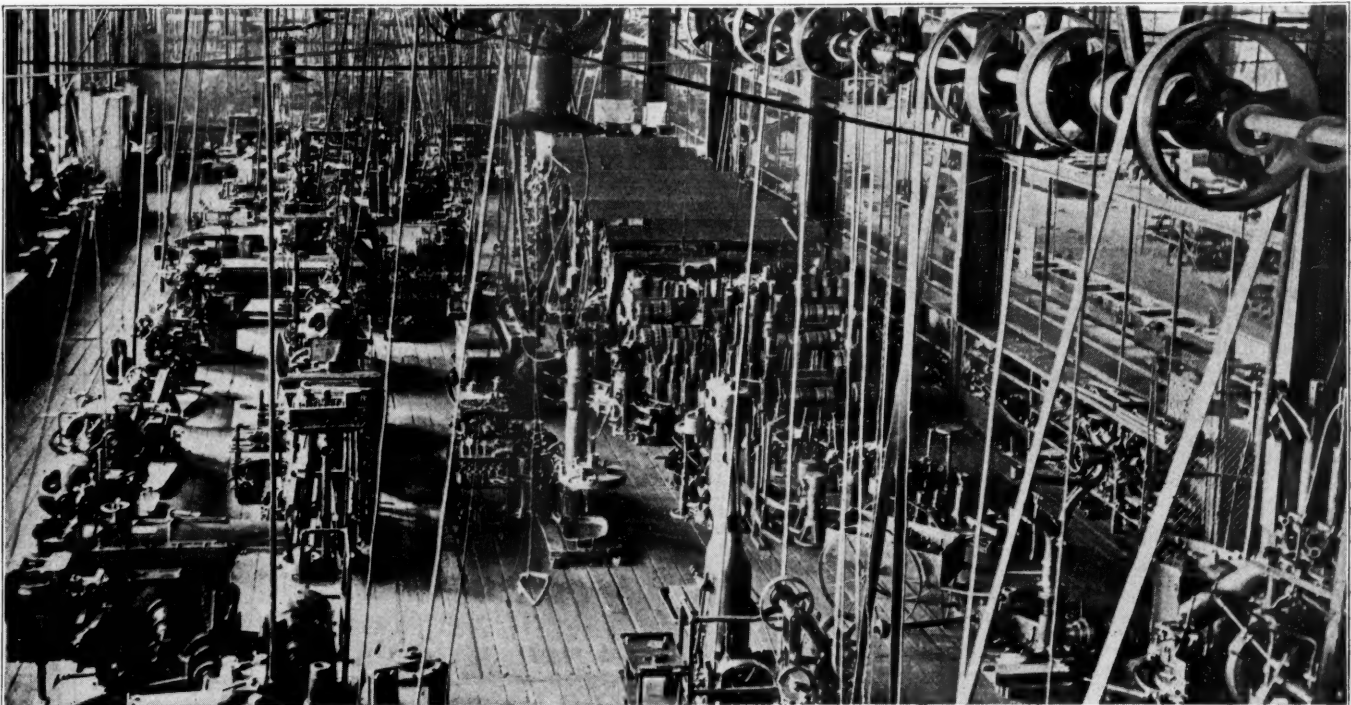


Fig. 2—Tool Room; Chicago, Rock Island & Pacific, Silvis, Ill.

- 1 6-in. slotter for die work.
- 1 30-in. shaper.
- 1 24-in. shaper.
- 1 20-in. shaper.
- 1 Cutting-off saw for cutting up stock.
- 1 Electric center grinder.
- 1 Portable floor jib crane to handle heavy work at machines.
- 1 3-in. arbor press.
- 1 Electric furnace for hardening high-speed reamers.
- 1 Electric furnace for hardening high-speed milling cutters.
- 1 Electric furnace for pre-heating high-speed milling cutters.
- 1 Full set B. & S. plug and collar gages.
- 1 24-in. steel gear rule.
- 1 8-ft. B. & S. standard steel rule.
- 1 12-in. vernier caliper.
- 1 24-in. hardened steel try square.

In grouping the tools it has been found that where grinders have been placed near lathes and other machines having exposed wearing surfaces, the emery dust has caused an increased wear on these parts. It is well to separate machines that have such surfaces or apply suction fans to the emery wheels to remove the flying emery.

The machine tools should all be individual-motor driven. This

work. J. W. Pike (Chicago, Rock Island & Pacific, Silvis, Ill.) said that they used tote boards to hold work that might be damaged, but that they were scattered about and broken and were not satisfactory. He recommended a bench top made of narrow pieces of hard white maple. While expensive as to first cost, it is durable and holds the vises true. A. R. Davis (Central of Georgia, Macon, Ga.) said that they used iron-topped benches for all repair work, but hard maple for new work. The size of a tap will be lost if thrown on an iron-top bench. E. R. Purchase, Boston & Albany, Springfield, Mass., recommended an iron-top bench for heavy work. By making the iron about 18 ins. wide, work, which would be damaged by the iron top, could be laid on the wood.

Turret Lathe.—Mr. Pike recommended the addition of a turret lathe to the list of tools, and said that one installed in his tool room had displaced three engine lathes. It can almost work up a bar in the time it would take a hack saw to cut it. John T. Fuhrman, Great Northern, St. Paul, Minn., advocated the use of a turret lathe for making flue expanders, sectional expanders, flue rollers and for blocking out stock for taps and reamers. It

formerly required an hour to finish a sectional expander on an engine lathe. Three may now be finished on a turret lathe in the same time.

Surface Grinder.—Mr. Purchase recommended the addition to the tool list of a surface grinder. It is handy for grinding dies after they have been hardened and for finishing blades for milling cutters. Mr. Davis said that a surface grinder had cut down the milling work about 30 per cent. in his tool room. In making blades for bolt-turning machines the stock is hardened and ground down. Mr. Fuhrman thought the grinder was a good tool, but it should be equipped with a hood and suction fan to carry away the emery dust. It is injurious to the workmen and damages the tools on which it collects. It cannot be wiped from taps and reamers and grinds or cuts them when they are put in use.

Hack Saw.—Mr. Purchase recommended the use of a hack saw for cutting high speed steel. A circular saw is usually damaged in doing this work.

Disc Grinder.—Mr. Pike recommended the use of a disc grinder with emery cloth attached to the disc. He uses it for reducing the stock for bolt-threading dies, etc. The disc is 18 ins. or 20 ins. in diameter and the grinder is operated by a boy.

Rock Island Tool Room at Silvis, Ill.—This tool room, a general view of which is shown in Fig. 2, is 40 ft. x 145 ft. In it are seven tool racks containing the tools for general circulation. These can be called for from any point along the 145-ft. counter. Two benches are fitted for pneumatic tool work, all the repair work to such tools for the entire system being done here. The machine tool grinding is done on two Sells' tool grinders, which are operated by especially trained handymen. The tool tempering is also done in this room. The equipment consists of four engine lathes, one 2-in. x 26-in. motor-driven turret lathe, one motor-driven shaper, one planer for forging die work, two universal milling machines, one vertical milling machine, one automatic gear cutter, fourteen grinding machines for all kinds of special and general grinding, and four drill presses. In the foreground of Fig. 2 is shown a two-wheel cart. This is used for taking up and delivering machine tools and supplies, such as files, chisels, punches, electric lamps, emery cloth, hammers, monkey wrenches, oil cans and other supplies needed by the workmen in the different departments. All tools needed in repairing locomotives and all repairs to machines and traveling cranes are taken care of here. The tool foreman, Mr. Pike, has under his charge forty-five men, including tool checkers, delivery men, handymen, tool temperers, machinists, tool makers and die sinkers.

TAPS AND REAMERS.

The latter part of the discussion of the paper on tool room equipment was devoted to the making of taps and reamers. Mr. Purchase said: "We have lead pots, and harden in oil and water. We annealed a lot of 24-in. reamers, recut them and hardened them over again. They sprung quite a little, some of them $\frac{1}{4}$ in. We placed them in oil at 375 deg., put them on a lathe, adjusted a jack and sprung them up. They were allowed to remain for a while in this straightened condition with a torch playing on them, being careful not to let the reamer get beyond a drawing color."

E. J. McKernan, supervisor of tools, Atchison, Topeka & Santa Fe, said: "We allow $\frac{1}{32}$ in. over size; then they are taken to the tempering room. They are $28\frac{1}{4}$ in. long over all, and come out straight enough to go to the grinder and finish up with the $\frac{1}{32}$ in. over-size removed." G. L. Linck, Houston & Texas, Houston, Tex., and August Meitz, Pere Marquette, Grand Rapids, Mich., follow the same practice. J. C. Breckenfeld, Frisco, Springfield, Mo., said: "In getting carbon steel from the factory and shaping it to a smaller size, you straighten it when cold. When you get the temper out it will spring back.

I find that preheating the steel before using it at all—putting it in a furnace and bringing it to a low red—seems to release the strain in the material to a certain extent and does away with the shrinking of taps and long reamers."

GRINDING WHEELS.

H. E. Blackburn, of the Erie Railroad, Dunmore, Pa., presented the following paper on this subject: If Webster was to come back and make a trip through a modern shop, he would certainly have to revise a few things about "to grind." Instead of a slow, severe, continuous process of rubbing of material, it would read, "a rapid cutting process of reducing material to accurate size." The old method of reducing metal by machining it in the lathe and leaving it large enough to allow for filing and polishing to size, never did gage up to be round or straight. The next move was to machine the metal and allow enough to finish on the universal grinder. Now cast metal or drop forgings are made large enough to grind to size from the rough in some form of an automatic grinder, thus eliminating all machine work and allowing hardened surfaces to be finished to accurate sizes.

Just as much judgment is required in selecting wheels and speeds, as in selecting tools, speeds and feeds for machine work. While no absolute rule holds good in ordering wheels, when you ask for soft wheels most of your troubles are over (that is if you can get them). The storekeeper may tell you that he notices that hard wheels last longer. Well, so does the work you are trying to get out. The management may say that the soft wheels wear away too fast, and that they do not keep their shape, and here is where it is up to you to "get busy."

Cobblestones, flour or emery and glue do not go far in making up a wheel in this progressive period. Still there are a few firms trying to convince you that it is a good combination. With such grits as alundum or carborundum you can pass over the question of material used, and study the grain and grade question. If the grains (commonly called grits) are too fine, they soon clog up. If the grade is too hard, the grains, fine or coarse, cannot break away to expose a new set of grains, and the work becomes burnt from this "life-everlasting glazed wheel." There is only one place that you can use a hard wheel—put it on a bolt for a washer.

If you are allowed soft wheels of from 40 to 60 grains, you can grind or finish all the work that comes to a tool room. Do not be deceived into believing that it takes a 90 grain wheel to do finished work. A good all around grinding and finishing wheel is a 24 and 36 grain mixed soft wheel, speeded up to a mile per minute surface speed if it is allowed plenty of water; with a traverse feed of $\frac{3}{4}$ the face of the wheel to one turn of the work, you will have a fine finish. If you wish to take a roughing cut use from 15 to 30 ft. per minute feed.

Keep the face of the wheel as narrow as possible. Wide faces on small work cause chattering, a fatal thing for both work and wheels; a $\frac{3}{4}$ in. face on 8 in. wheels is a good size, but if you value your good looks use the elastic wheel instead of the vitrified when using these slim widths in deep gashes. A wheel that works well on large work does not as a rule cut well on small work, and it is always advisable to use the smallest wheel that the work will admit of, so as to get a good clearance.

Cast iron or steel requires a soft coarse wheel.

Rolled iron or steel requires a soft medium wheel.

Cast or rolled brass requires a soft fine wheel.

A good rule is, the harder the stock to be ground the coarser the grain of the wheel, and all wheels should be soft enough to be scratched with a scribe before you mount them for use.

While it is necessary now and then to violate tradition in order to get there with what wheels you may have left over from your first order, avoid the slim, slick-looking hard boy, for like the aeroplane, he will do stunts in the air, and remem-

ber that the devil himself cannot make one wheel for "all comers," if he can furnish the sparks. Teach the operator to have the wheel fit the arbor "neat." Be sure the arbor and washers run true and that the drive-washer is keyed on the arbor, this washer to be one-third the diameter of the wheel. Use rubber pads between the washers and the wheel, and "for the good of the order," don't allow the operator to "soak" up the nut with a hammer. When everything runs dead true you can feel safe for a good job, as a wheel out of true is only a one-eighth producer.

True the wheel with a diamond, and dress it frequently with a spur cutter. Instill into the operator's mind that dressing is not trueing. With rough diamonds at \$12 mounted, there is no excuse for not having one. The operator should dress and true the wheel between heavy and finishing cuts.

Remember that old machines and methods and slow operators soon start a graveyard in any shop. If you have any civic pride, keep clean and set the example for the operator to do likewise. If you wish to find out all the bad points about the wheels you are using, ask the wheel agent of a rival firm—you will be surprised at the outburst. Last of all, do not "knock" any wheel until you have tried it on different metals with variable speeds and feeds.

Discussion.—F. W. Luger, Big Four, Delaware, Ohio, said that he had tried several times to use a hard wheel but that the soft wheel is better and gives a smoother surface, provided the speed is high enough. The clogging up of the grain is not to be entirely avoided. From 40 to 60 grain is a good wheel.

Mr. Pike:—The writer has considered machines having fixtures for holding the work; a soft wheel is the ideal one for general machine grinding where the pressure can be regulated, but where it is held by hand an altogether different wheel is necessary. We are doing two-thirds of our work by grinding, and the more knowledge we can get on grinding wheels and their use the better.

Judging from the discussion a wheel between 40 and 60 grain, depending on the class of work, gives the best results; it must not only be free cutting but must keep its size. The general opinion seemed to be that high-speed steel should be ground dry, although Mr. Bray said that some grades seemed to grind better with a wet wheel. Gust Gstoettner, Chicago, Milwaukee & St. Paul, West Milwaukee, Wis., thought that bad results, sometimes attributed to a poor wheel, were often due to its being run at too low a speed.

STANDARDIZATION OF STEEL.

Henry Otto, Atchison, Topeka & Santa Fe, in speaking on this subject, said: Steel for making the various kinds of tools should be standardized. We all know that there is a great liability of the purchasing agents being deceived in purchasing steel for tool work by the low prices quoted by manufacturers, more attention being paid to the purchase price rather than to the quality of the material. I know of several cases where steel has been purchased at a very low cost which was not fit for the class of work for which it was intended, and the breakage of tools was so great that the company would have been 50 per cent. ahead if it had paid twice as much for a better steel. We all know that we cannot use the same kind of carbon or high-speed steel for the various classes of work, and we also know that it is impossible to use steel containing the same percentage of carbon for all kinds of tools. We cannot make a shear blade and a frame reamer from the same grade of steel, and if we were able to adopt a standard for this class of work, we would make a large saving during the course of a year. If each of us were to make a study of the subject and arrange to discuss it at our next meeting, we would be able to adopt standards of high-speed and carbon steel for each particular tool used in our shops.

DISCUSSION.

J. Martin (Big Four, Beech Grove, Ind.):—I believe all standard steel companies make a good grade of steel, and the most important thing is the treatment which we give it. Steel is injured more in heating than in any other process of handling.

Mr. Fuhrman:—If a man understands how to select steel for the different classes of work, he is generally successful; if he does not, he is a failure.

Mr. Davis:—We order all steel by a blue print—A1 and A2 are high-speed steel; B1, B2, B3, B4, B5, B6, the carbon steels. For reamers we use from 1.00 to 1.12 carbon, and for boiler punches .80 to .90 carbon steel. We have a rack in the tool room and as soon as the steel is brought in it is painted a color corresponding to its grade. A chart shows what each color represents, and when a man wants a bar of steel he knows just what he is getting when he goes to the rack.

A. M. Roberts (Bessemer & Lake Erie, Greenville, Pa.):—I have not found any tools that I felt afraid of making of high-speed steel. We do not make a ball reamer or a radial reamer of any kind except of high-speed steel. We use high-speed steel for most of the taper reamers and taps. We use milling cutters of high-speed steel, and we have milled a crucible staybolt tap about 30 ins. long in fifteen minutes, provided nothing went wrong. It almost looks impossible, but it is a fact, and if we were in a hurry or holding up a job we could do a little better. The solid tap is almost a thing of the past with us. We cannot afford to put in time making solid taps. They crook and it costs money to straighten them. There are some things in coke and coal that are detrimental when used in connection with the tempering of steel. The electric furnace is ideal for this purpose and gives an accurate heat. The trouble has been that the men handling the steel have not studied it sufficiently to keep up with the progress of its development. Get your heats right and use a proper grade of steel for the work, giving the right temper, and you will not have trouble. The class of men who use reamers are not mechanics, therefore there will be some breakage, but if we get the full efficiency of the steel, hardened in the proper manner, we will have less breakage than if we guessed at it and hardened haphazardly.

Reamers.—Mr. Pike said that they used high-speed steel for the larger reamers.

Mr. Fuhrman:—High-speed steel makes a much better tool than carbon steel. For rod reamers carbon steel can be used by putting in four grooves and inserting high-speed steel blades. This kind of a reamer is liable to bend if it is used very hard, but I have one that has been used every day for almost a year and it is still in good condition. The large knuckle reamers are made the same way.

Mr. Hendrikson:—We make all our frame reamers and rod reamers of high-speed steel and temper them in oil. We tried the air blast but it was uneven and caused soft spots.

Mr. McKernan:—We make a great number of reamers 28½ ins. in length and our experience is that carbon steel gives the best results. High-speed steel reamers, driven by an air motor in the hands of unskilled labor, are easily snapped off. That has been our experience, and we have to use carbon steel in order to get the output and keep the cost down. High-speed steel shell reamers are all right, but not the solid ones. Some one remarked that high-speed steel reamers will last twice as long as those of carbon steel. If they do not last six times as long, they are expensive reamers, because you are paying on an average from \$.45 to \$.70 per lb. for high-speed steel, regardless of whose make it is, and handling it very carefully; you have to reduce the speed of your machines to machine it. Your milling cutters are of high-speed steel and are expensive. For the tempering of high-speed reamers or any high-speed steel, if you can possibly secure it, use the barium chloride process, especially for threading dies and tools with keen-cutting edges; they come out as highly polished as possible. You can draw

them up to 350 degs. or 500 degs. and have a clean thread and no marring.

Mr. Pike:—We make a great many reamers 36 ins. long. The largest diameter is $1\frac{3}{8}$ ins. High-speed steel is not the proper material for a reamer of that kind. Considering the great cost of the reamer and the possibility of breaking it, you can readily see that we can make six carbon steel reamers for

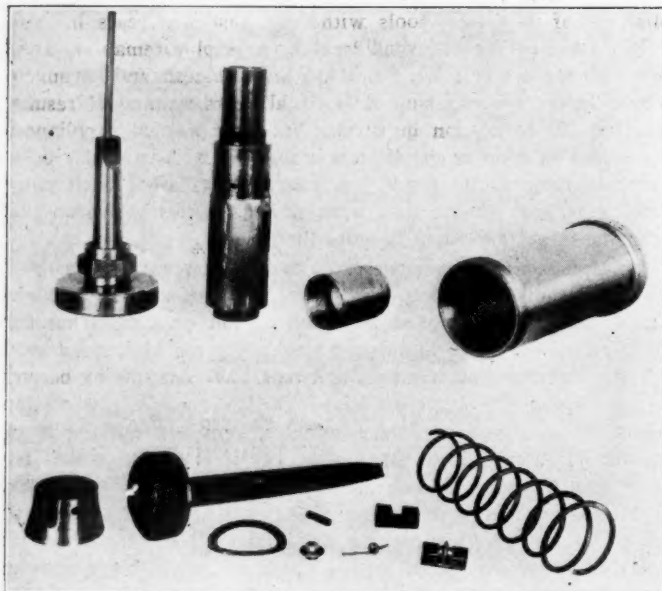


Fig. 3—Details of Tool for Cutting Out Flues.

the cost of one of high-speed steel. From my experience I would recommend steel of about .90 carbon; it is stronger and more durable.

Mr. Luger:—High-carbon steel has proved most efficient for fluted reamers. For cutters and rose reamers the high-speed steel has given better results.

Mr. Meitz:—The best results we have had have been with

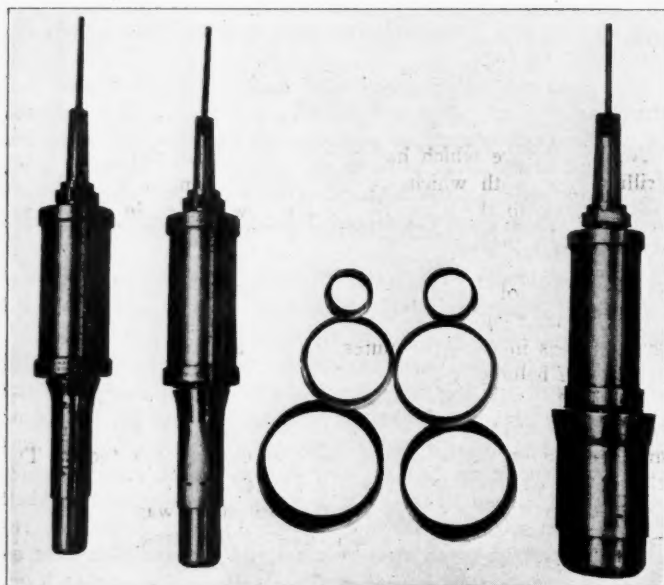


Fig. 4—Tools for Cutting Out Flues.

carbon steel—about .80 carbon. Do not give too much clearance on the cutting edge. Shell reamers and inserted blade reamers for knuckle pins, we make of soft steel with inserted high-speed steel blades. They last for nearly a year. The boiler-makers like them better than the fluted ones.

Mr. Martin:—We have made both kinds, high-speed and carbon steel, but I think carbon steel is the most successful and will

be until our high-speed steel becomes more elastic than it is now. We use the .85 or .90 carbon steel for reamers.

Tempering High-Speed Steel Tools.—Mr. Hendrikson said that they had had trouble with barium chloride in tempering dies and taps. Small hard beads formed between the threads and the taps were worthless. The beads were as hard as glass. The same trouble was experienced with bolt-cutter dies, but it was because the barium had been used several times. Oxide of iron will get into the barium and float on top, and it unites with the hardened steel in little globules. After using the barium several times it should be thrown away.

Mr. Davis:—I have had the same experience with the barium. In tempering small stuff it mottles the work very quickly. The first time you see a sign of mottle, throw the bath away or it will ruin the work.

Mr. Gstoettner:—In tempering high-speed tools, we use barium to a large extent. We make our reamers of high-speed steel. Carbon steel will not last as long.

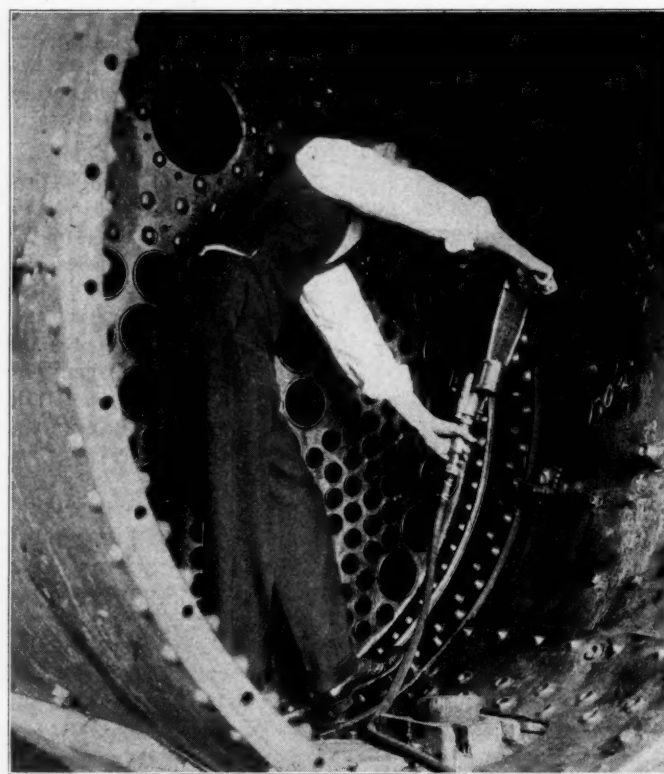


Fig. 5—Flue Cutter in Operation.

Miscellaneous Tools.—J. B. Hardman (Southern Railway, Atlanta, Ga.) said that the greatest trouble they were having was with the beading tools, snaps and pneumatic tools. They break in the shank, and the snaps also break in the fillet. He took an old tire and had the blacksmith forge it. A lot of boiler snaps were made and gave better results than anything else they have ever tried.

Mr. Roberts said that they used a vanadium steel, costing $6\frac{1}{2}$ cents per lb., for punches. It is tough, hardens nicely, and is also being used for dies, chisels, beading tools and taper pins for flue expanders.

FLUE CUTTERS.

John T. Fuhrman (Great Northern, St. Paul, Minn.) said that cutting out flues was a helper's job and that it was also important that it be done in the shortest possible time. Efficiency in a flue cutter is gaged by three things—rapidity of cutting, clean cutting and durability. He described a flue cutter that he had designed and patented, which is driven by a corner-drilling motor, and will cut the flues at both ends without any

change in the cutter; it is operated by one man and will cut a 5-in. flue as easily as a 2-in. one. As shown by the photographs, Figs. 3, 4 and 5, it has three disc cutters, each set in a sliding block, the blocks being fitted into grooves to bring the cutters in line and equally distant apart. The blocks rest on a three-sided taper spindle inside the sleeve. The other end of the spindle is connected to a piston in the cylinder, which is controlled by an air-valve in the motor, but independent of the motor throttle. The three cutters are expanded equally by the taper spindle, thereby forcing them through the flue as they are

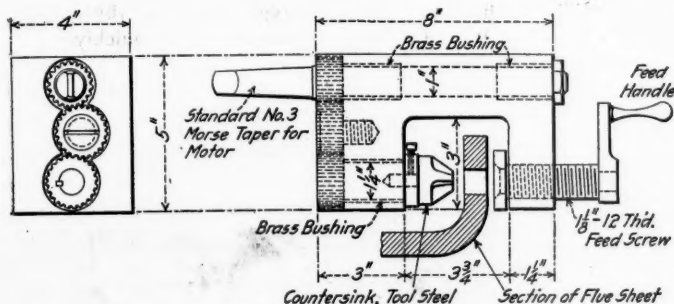


Fig. 6—Tool for Countersinking Tube Sheets.

revolved by the motor. The result is a rapid cut, leaving a flue with a clean finish on the end without the usual burr.

The advantages of the pneumatic cutter are: Less power than required to drive the knife-blade type. A motor that is strong enough to drive a 1 1/4-in. drill will drive a 2-in and 2 1/4-in. cutter. It does away with the rigging belted to the front end and the knuckle joint shaft which is used with the knife-blade cutters. The same cutter will cut the flues at both ends without any change. Only two men are required to remove the flues from the boiler; and if the flues are not cut at the back end it will take three men. It saves one handling of the set of flues in the flue room, as they are ready for welding when they come from the rattler. One man can handle the cutter, and it is ready for use as soon as the air hose is connected to the motor.

To remove a set of 350 flues with the knife-blade cutter requires one man five hours for cutting flues, three men six hours removing them, and one man one hour to remove the burrs at the front ends. With the pneumatic cutter above described, one

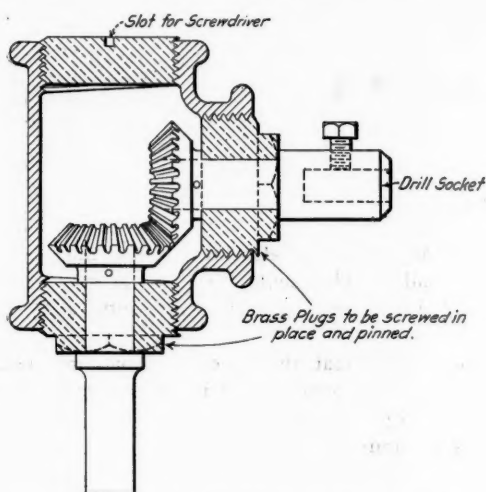


Fig. 7—Device for Drilling at Right Angles.

man can cut both ends of the flues in two hours, two men will remove them in three hours, and it will take one man two hours to remove the burrs. This leaves fourteen hours in favor of the pneumatic cutter, or about four dollars to a set of flues. The cutter is reliable, even in the hands of an unskilled workman. The parts that wear most are the small disc cutters and the pins that hold the cutters in the sliding blocks. These parts

cost only a few cents and are easily replaced. An air pressure of from 90 to 110 pounds is required to obtain the best results.

PNEUMATIC TOOLS AND APPLIANCES.

In a paper on this subject A. M. Roberts, Bessemer & Lake Erie, Greenville, Pa., said: The increased use and wider application of pneumatic tools within the last few years has put a heavy burden on the shoulders of the tool foreman. I have constructed several devices for use with motors and hammers, which we have been using for several years with good results. The first consideration in the designing of air tool appliances is a good, strong, rugged construction to withstand all kinds of rough usage, as they are operated by all classes of workmen. The abuse of pneumatic tools is harder on them than all the labor to which they are put. For illustration, a workman took a reversible motor with a 3/4 inch drill, and after working for about thirty minutes, returned to the window and complained of the drill not cutting. Upon examination we found that the motor had been running backward.

We countersink a flue sheet wherever it happens to be—on the wagon or floor—by a small device used with an air motor. A flue sheet may be countersunk with it in about two hours. This is a great improvement over the old way where the flue sheet was stood on edge at the radial drill press, with two men

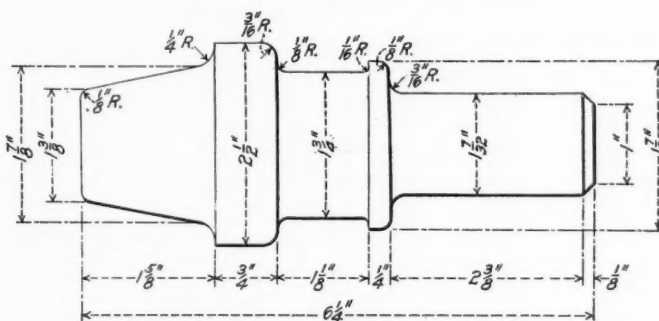


Fig. 8—Tool for Belling Tubes With an Air Hammer.

to hold it, the pressman using a long bar of steel with flat drill at the end. This method required about seven hours a sheet. A drawing illustrating the application of the new device is shown in Fig. 6.

Another device which has proved very successful is an angle drilling tool, with which we bore at right angles through car sills underneath the cars. Holes are now drilled in about one-eighth of the time formerly required. This device is shown in Fig. 7.

A belling tool for belling flues, and which is used in a 9-in. stroke hammer, is shown in Fig. 8. This tool will bell out about seventy flues in twenty minutes, making a large saving over the old way of belling by hand.

It would pay a company having a large number of pneumatic tools in operation to employ a competent man to go among the men, instructing them in the use and care of the tools. The elimination of abuse of tools and loss of time of men through ignorance would more than pay the inspector's wages. I understand that this is being done in some of the large shops at the present time. I have known cases where at least three hours could be saved per job by using the motor best suited to the work. Such an inspector would take care of this.

BOILER SHOP TOOLS.

Gust Gstoettner, toolroom foreman of the Chicago, Milwaukee & St. Paul, West Milwaukee, Wis., read a paper on Boiler Shop Tools, of which the following is an abstract:

Drilling Tell-tale Holes in Staybolts.—A home made rotary

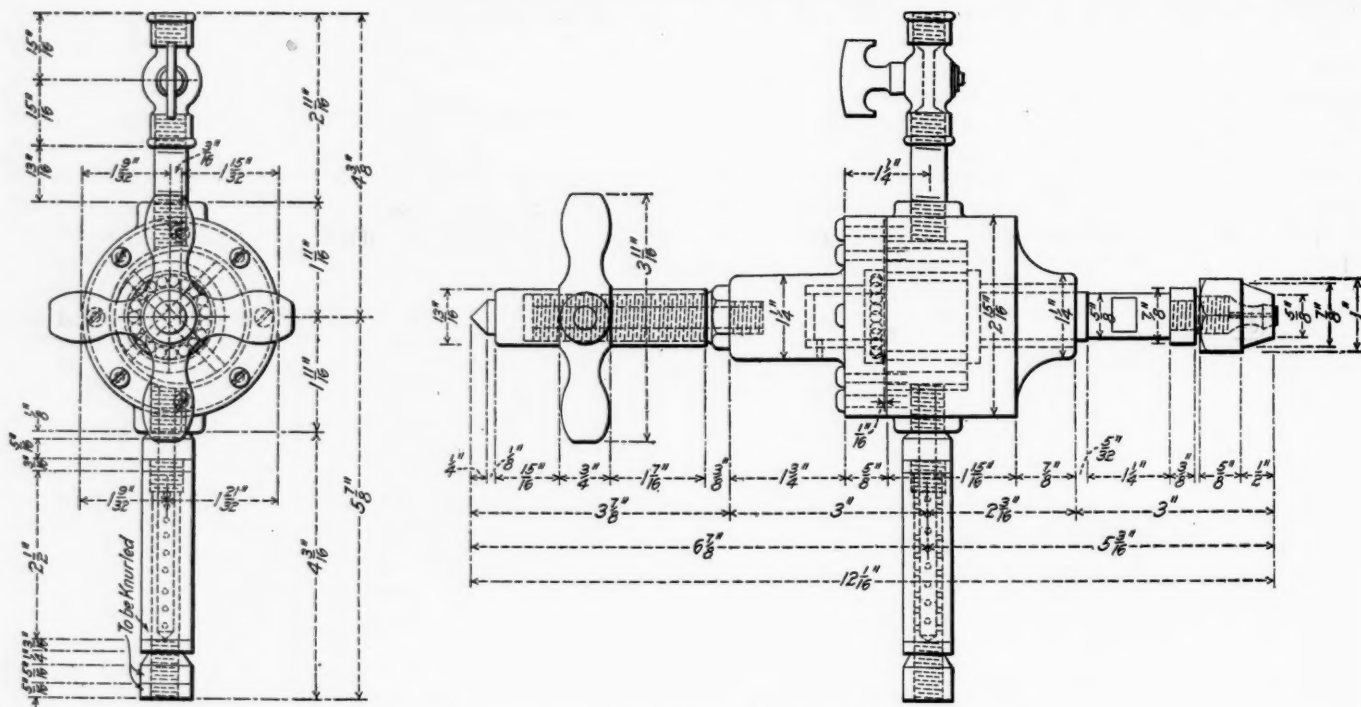


Fig. 9—Rotary Air Motor for Drilling Staybolt Tell-Tale Holes.

air motor for drilling tell-tale holes in staybolts is shown in Figs. 9 and 10. The capacity of the motor, with 90 lbs. air pressure, is up to 3/16 in. holes. The speed of the drill is about 2,000 revolutions per minute. High speed steel drills should be used. The motor runs smoothly and the breakage of drills is practically eliminated. While we use hand pressure for feeding the motor, it is so arranged that a screw feed can easily be applied. A small, durable chuck is used for holding the drills, making it possible to get into corners. Aluminum blades will give the best results. The first motor was in constant use for 16 months before it came to the tool room for repairs. The output has been trippled by its use.

Flue Scarfing Machine.—A flue scarfing machine in which

safe ends for the flues are cut, beveled off and the burrs taken out in one operation is shown in Figs. 11 and 12. The flue is fed into the machine through a hollow spindle and is pushed against a stop to get all the pieces the same length. It is held rigidly in the automatic chuck which is operated by an air cylinder. A taper reamer is used to remove the burr and break the sharp corner of the flue. The cutting and beveling is done by a high speed tool which is ground to the proper angle. The jaws in the chuck are adjustable, and can be used for different size flues. They are bored out to run perfectly true and are hardened. The operation of the machine is simple and it does the work in an effective manner.

Flue Swedging Machine.—A flue swedging machine is shown

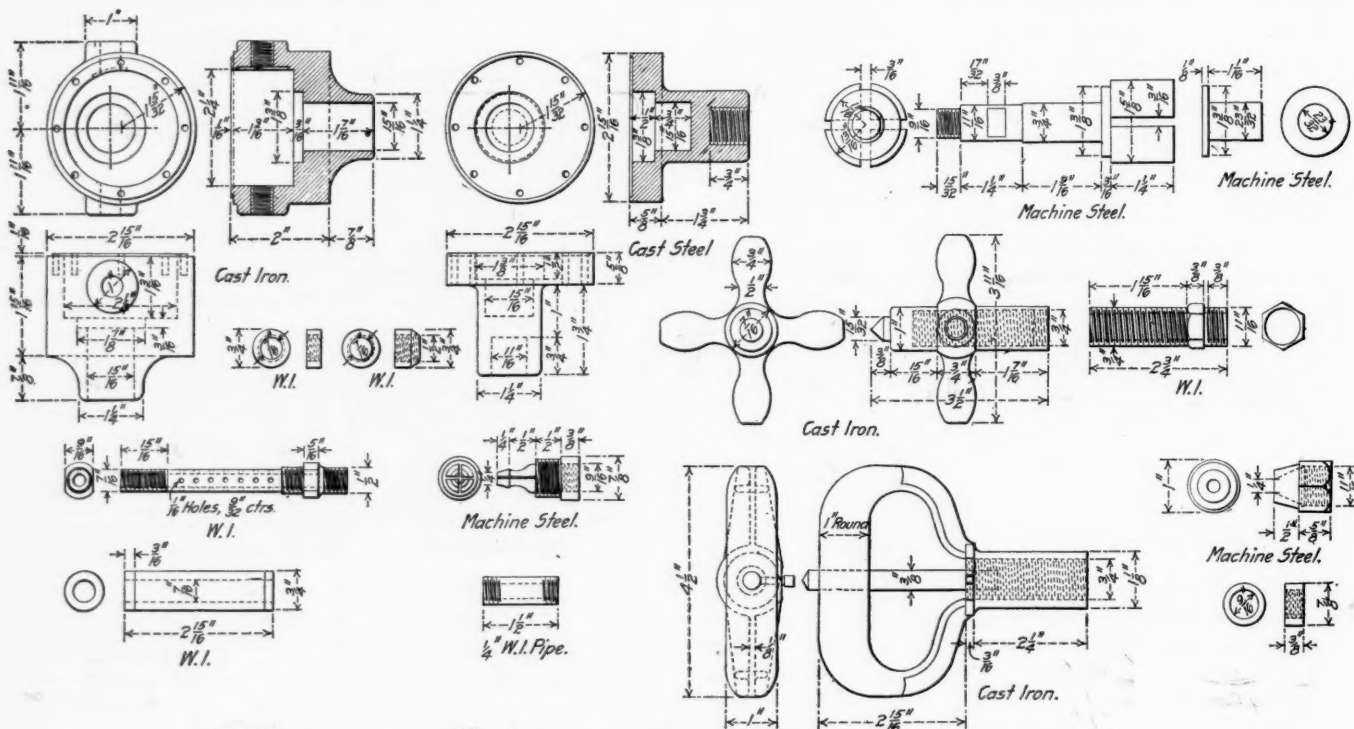


Fig. 10—Details of Rotary Air Motor for Drilling Tell-Tale Holes.

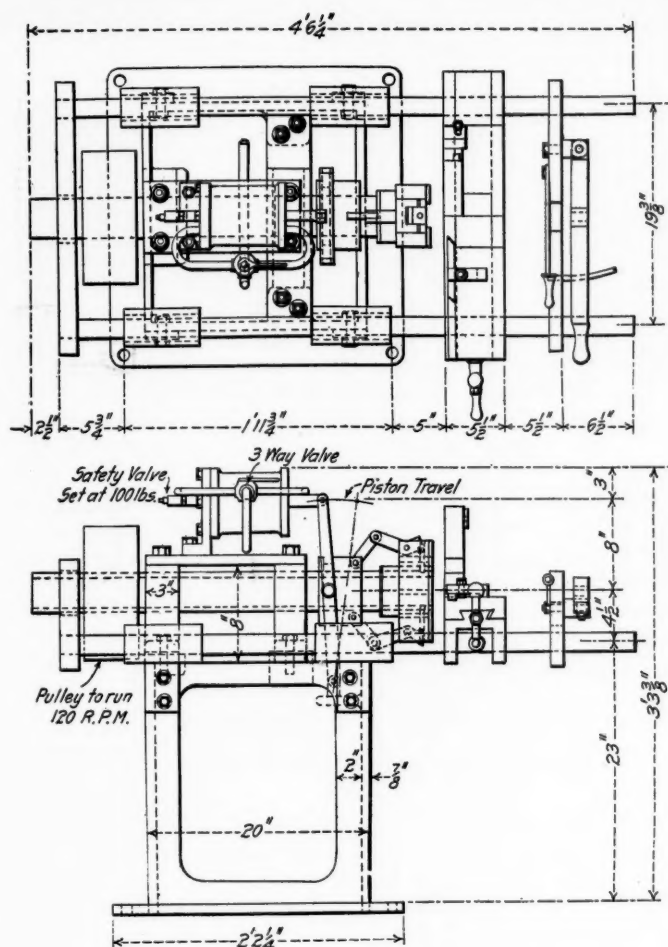


Fig. 11—Flue Scarfing Machine.

in Fig. 13. It is operated by an air cylinder and a long stroke air hammer. The levers controlling the dies and air hammer are on the base of the machine and are manipulated by foot to give the operator free use of both hands to handle the flues. The dies are made of tire steel and are not hardened. An old cracked air hammer barrel can be used for this machine, as a sleeve can be shrunk on the outside, and the barrel reamed out to get a good piston fit.

Gage for Threading Staybolts.—An adjustable radial staybolt gage, which is used to cut threads on radial staybolts from 12 in. to 32 in. in length, and from 1 in. to 1 1/8 in. in diameter on the small end, and 1 1/8 in. to 1 1/4 in. on the large end is shown in Fig. 14. With a bolt cutter having a 6 thread lead screw, or applying a lead screw to an old bolt cutter, it is possible by the use of this gage to get exactly the same

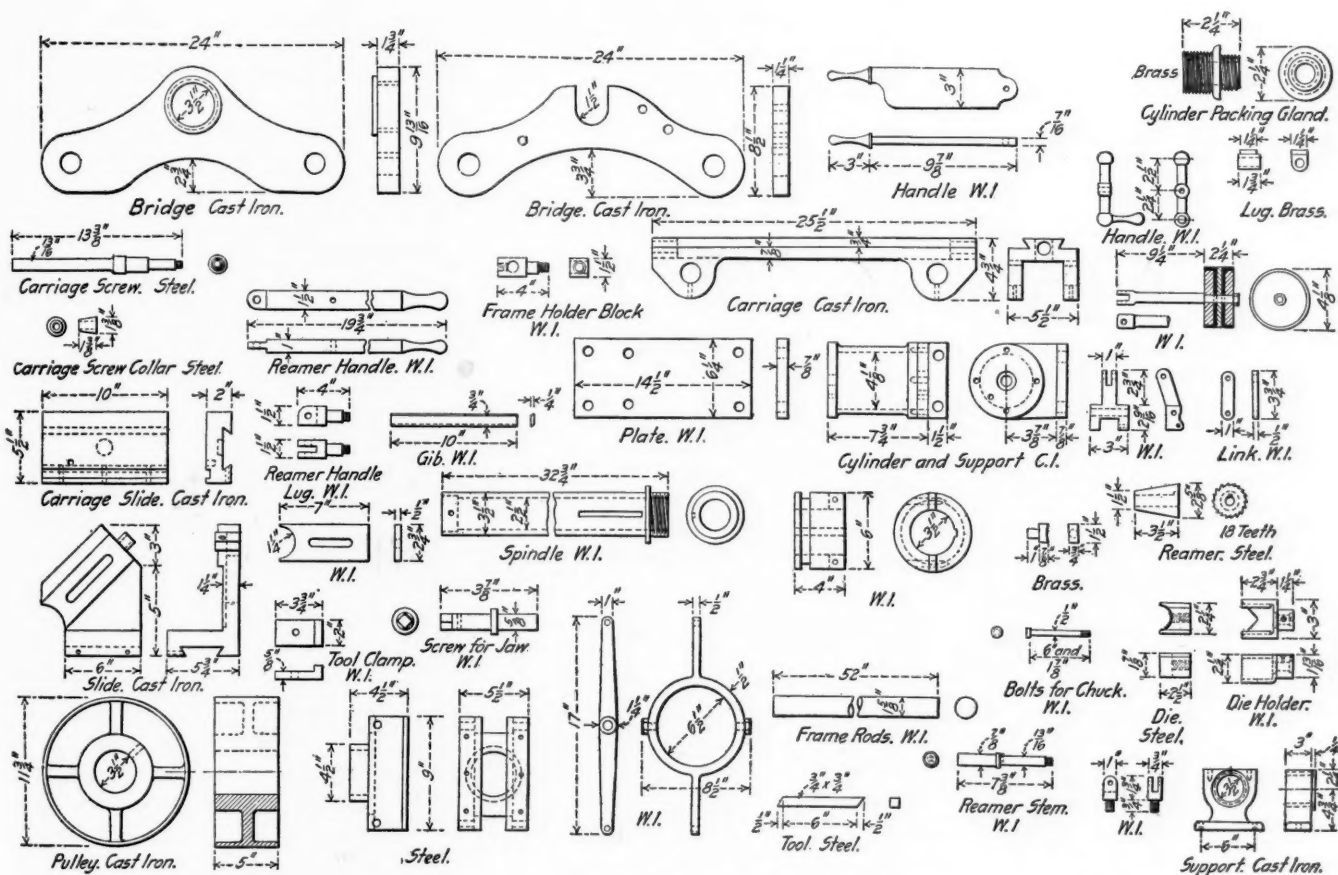
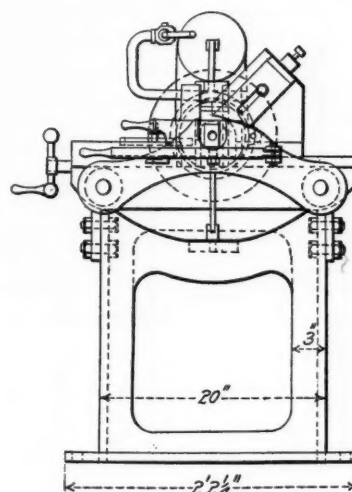
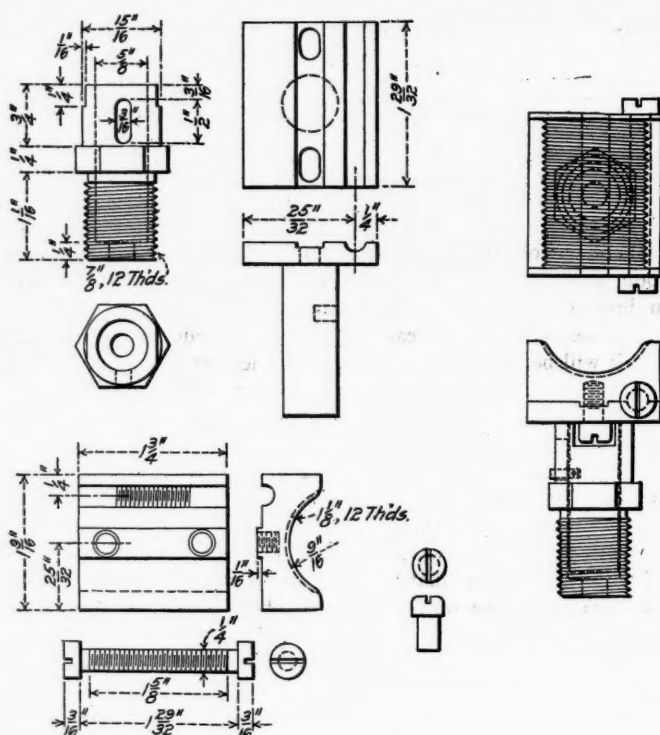


Fig. 12—Details for Flue Scarfing Machine.

thread on the radial staybolt as on the radial staybolt tap. There is always some variation in the pitch of a tap, especially when it is from 30 in. to 42 in. long; no matter how careful the manufacturer may be it is bound to get out some in hardening. Take the tap that you use for tapping out the holes in the boiler and place one end of it carefully in the die head of the bolt cutter and the other end in this gage (adjust the gage so that the pitch will correspond) which is fastened on the carriage, central with the die head and directly back of the jaws. Remove the tap, cut the thread on the large end of the bolt and place in the gage carefully, then cut the thread on the other end of the bolt. You will get exactly the same thread on the bolt as on the tap, thus ensuring a good steam tight fit in both of the boiler sheets. Often the thread on the small end of the tap is not in line with the large end; this may be easily overcome by using the adjustable gage. I have seen cases where the radial bolt has been stretched to conform with the tap by hammering it. This is bad practice, as it helps to take the life out of the bolt and leaves it more or less crooked. By using this gage you can save considerable work by the boiler maker and his helper and have better staybolts in the boiler.

Flanging Machine.—A flanging machine which is simple in design and a big time saver is shown in Fig. 15. It is operated by hydraulic pressure of about 1,500 pounds per square inch. The cylinder has a 10 in. bore and is made of cast steel to provide sufficient strength. The press is operated by a three-way valve. The frame is made of steel and consists of a yoke



built over a foundation block. A 2-ton chain hoist is fastened on an arch above the yoke for handling the male die. This machine is capable of flanging in a single heat such parts as front end doors, cylinder head covers, air drum heads, door holes, etc. Locomotive front ends up to 75 in. in diameter have been flanged on it.

MR. KELLY'S ADDRESS.

James W. Kelly, first vice-president of the Master Boiler Makers' Association made some suggestions as to how the tool room foreman could co-operate with the boiler maker foreman in improving the efficiency of the boiler shop. Among other things he said: "You can determine methods of doing work which will be cheaper and faster. I remember when it took two minutes to cut a flue hole. The tool room foreman with the aid of the steel men have improved this, but there is still room for improvement.

"By the proper tempering of staybolt snaps and rivet sets and selecting the right kind of steel, a great saving will be accomplished. We have lots of leaky radial staybolts and the tool foreman is the man who can help us by seeing that the tap will tap the holes so that they will be perfectly in line and properly threaded. We want self hardened drills for removing staybolts. We want a drill that we do not have to use oil with; one that will do the work rapidly. It is up to the tool foremen to get the right steel for that purpose.

"Every tool room foreman has developed a cutter for cutting

out flues. Each cutter is the best, and it is up to this organization to get a committee to find out which is really the best cutter. We want a cutter that will remove a set of flues in the shortest time under hard service and stand up. I do not believe in having a cutter that requires five hours to rig up. Appoint a committee and request each man to give facts of what he is doing and how much it costs to maintain the cutter during the year. We boiler foremen have got to have that and you tool foremen can get it for us.

"I have found from experience that making each man responsible for his own drill and tapping machine is a good plan. If they are checked out by numbers and the men are held responsible for them they will keep their machines oiled. When a man is not busy drilling out staybolts he is required to tap out staybolt holes. It is the same with air hammers. The chippers and caulkers have their own hammers all the time, and there is a great saving. If there is a checker and he reports any carelessness to the foreman, you get good results."

PNEUMATIC TOOLS, HANDLING AND MAINTENANCE.

The first part of the discussion following the reading of the above three papers was devoted to a consideration of the problem of lubricating, handling and maintaining pneumatic tools. This discussion in abstract follows:

Mr. Martin:—We had a great deal of trouble with air motors.

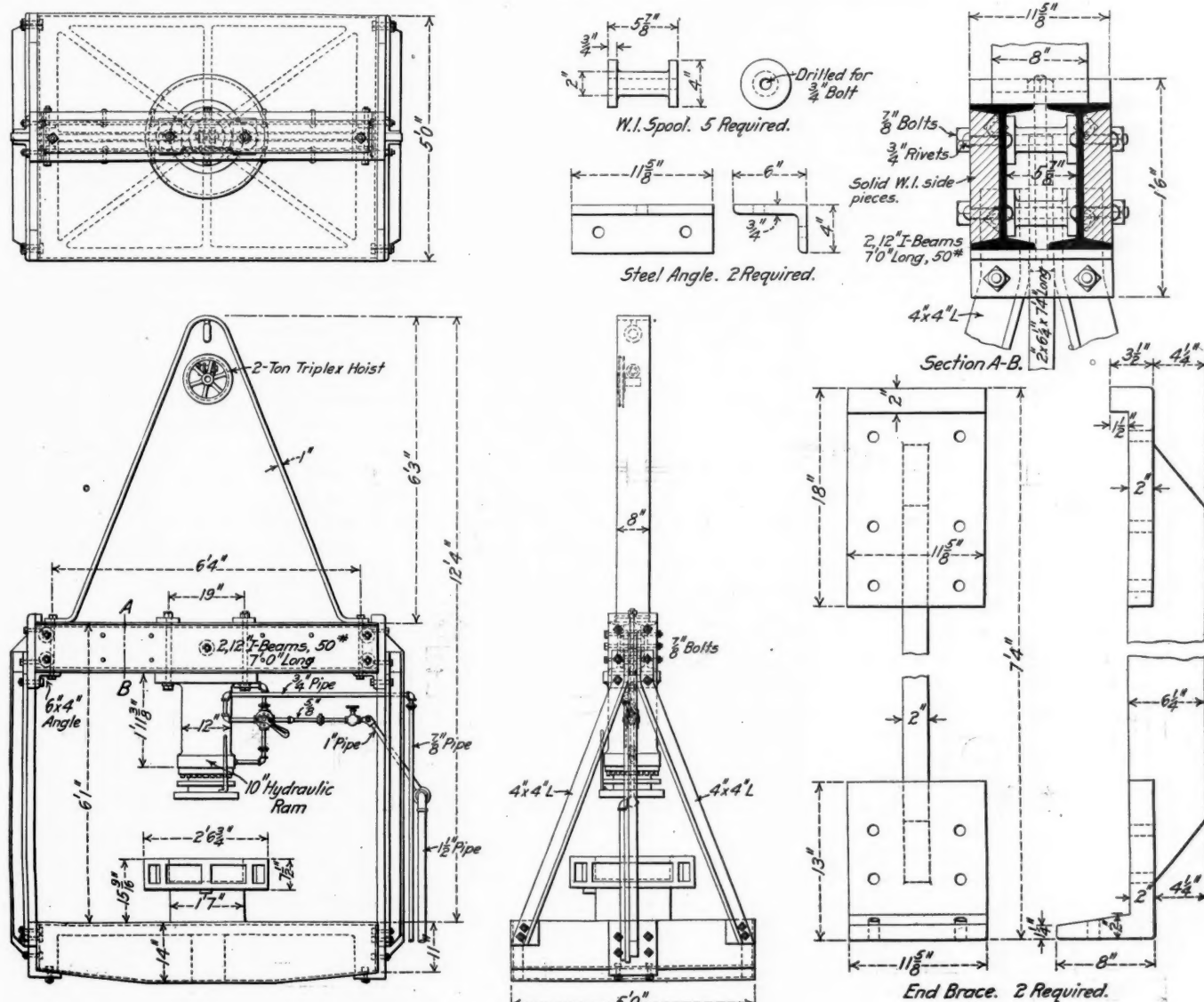


Fig. 15—Hydraulic Flanging Press.

and employed a man who does nothing but oil and take care of them; it has been a paying investment.

Mr. Hendrikson:—We have the air motors turned in every night and they are oiled every morning.

Mr. Linck:—There are lots of machines that ought to be oiled during the day.

Mr. Meitz:—We had considerable trouble with the motors, but we now fill the inside of the motor case with artificial engine grease. It holds the oil in the motor and the motor is better lubricated all through. It lasts twice as long and is always lubricated.

Mr. Breckenfeld:—We have a helper go around the shop twice a week; he opens the motors and packs them with No. 3 grease, as they call it; I do not believe that we have had any trouble with a motor on account of not being lubricated in six months. On Saturday night we have all tools turned in and the helper examines the motors to see that they are properly oiled.

Mr. Fuhrman:—It is a good thing to have an atomizer for oiling pneumatic tools. Fill it up twice a day; it does away with a good deal of trouble. Our system is to always keep after the motors in the tool room, and if one is not running right it is immediately returned to the tool room.

A. Stern (Chicago, Rock Island & Pacific, Chicago):—We use the automatic oilers.

J. B. Hasty (Atchison, Topeka & Santa Fe, San Bernardino, Cal.):—We pack air motors with grease once a week, over Sunday, and use grease altogether. We use a bath for the air hammers. They are turned in every evening and placed on pegs 5 or 6 in. long and are flooded at night with coal oil. The flooding arrangement is made of a reservoir in two sections; the lower section contains the oil, and the upper section the hammers; by admitting air to the lower part, it forces it up under the hammers and completely covers them with oil; they remain until morning. Just before the hour of opening, the night watchman opens the valves and the oil goes back to the lower tank; then we give them a touch of signal oil and pass them out. Nothing is done to them during the day.

Mr. Luger:—We use the same system at our shop, but the oiling process during the day is worrying me considerably. A boiler maker takes a hammer out and after it passes into his hands in the morning, there is no oil put in it during the day. We send out an apprentice at different times during the day who puts in a little aerolene, and that has to a great extent overcome our difficulties. In our air motors, we use aerolene entirely, and have no trouble. The only difficulty we have experienced of late is in the air motor throttles. They get dry, due to the men neglecting them, and we have to overhaul them frequently.

Mr. Breckenfeld:—When we know a new man is going on a job—generally an unskilled laborer in the boiler department—we try to have the men in charge of the motors go out and give him a few minutes' instruction. It has a tendency to save in the breakage of air motors.

Mr. Pike:—We have a young man go around the shop every two hours; he oils the machines through the throttle and in the case, and the gasket if necessary. If a section of hose is leaking he condemns it. These duties keep him busy. The atomizer may be all right, but it added to our troubles in that it made an additional part to maintain; also when the air line became old, small particles of rubber would pass through and clog it up; the man using the machine expected the atomizer to be on the job when it was not, and as a consequence the machine went dry. It pays to have one man be the judge of when a machine should come to the tool room for repairs. If he hears a squeaking or grinding, it must be taken out of service. A man using a machine will use it hours after the time when it should have been stopped. We placed all air tools in an oil bath until the insurance agents objected to the large quantity of oil being kept in the building, and we now find the individual inspection very satisfactory. We experienced some difficulty

after the shop had been closed down for a few days with the throttle clogging owing to dampness. We used mineral lard which amalgamates well with the moist air. It is cheap, and we use it generously and have very little trouble.

Mr. McKernan:—When a hammer is brought in throw it in a tank of coal oil. When you check it out, blow it out and oil thoroughly, and I do not think you will have very much trouble. When a hammer is kept out any length of time the man who takes it out is held responsible for oiling it. If the hammer comes back in bad shape he cannot get his check until there is a satisfactory explanation, and that has to be O. K'd by the general foreman in addition to his own foreman.

Mr. Meitz:—In our shop all tools are supposed to be turned in every night. The hammers go in a bath and lie there until five minutes before work time. No tool goes out without an oiling. When they come out of the bath we hang them up to drip, and they are oiled with valve oil and signal oil mixed. Valve oil alone is a little too heavy.

William Thomason (Pennsylvania, Renova, Pa.):—We have little or no trouble as far as the use and abuse of hammers is concerned. If a hammer is neglected we find out very quickly who is responsible. When a man checks a hammer out the boy knows what hammer he gets.

Mr. Fuhrman:—I believe the foreman who has charge of the men using the tools is the man who should be responsible for their proper use. He is the best judge. Sometimes he is not in favor of saving the tools; he wants the work and may abuse the tools worse than any man. There is a limit to everything, and every foreman ought to know what will bring the best results for his company. It does not pay to spend a day making a tool and have somebody spoil it in a half hour, even though you get the work out.

Mr. Luger:—We should not confuse severe use with abuse. A machine designed for any kind of work should be used to its full capacity all the time; we should try only to eliminate the abuse of the tool. I do not believe in nursing a tool.

Mr. Fuhrman:—A tool should be used for the purpose for which it is intended. A carbon steel tool should not be used as a high speed steel tool. If we do not care what kind of a tool we have and always use it at high speed we have trouble. It is the same way with small machinery. The men ought to know when a tool needs to be sharpened. When a reamer is used a certain length of time, it should be sharpened. Sometimes a tool is used until it breaks off, when if it had been brought in in time it could have been repaired.

Mr. Pike:—When we purchase a motor we attach a brass plate to a prominent part before it goes into service. On the plate is the name of the shop, number and size of work for which the tool should be used, i. e., "Machine shop, No. 20, $\frac{3}{4}$ in. to $1\frac{1}{4}$ in. drill; 1 in. to $1\frac{1}{8}$ in. tap." If the motor is not doing that work, we know it is the fault of the motor; it is not liable to be used on a larger tap or drill.

Mr. Martin:—We send in a breakage report which goes to the superintendent and he sends it to each foreman of the shop with a list of names and what they did in the way of breaking or damaging tools.

FLUE SHEET CUTTERS.

Mr. Pike:—The cutters for our flue sheet cutting tool cost us for labor only about one cent apiece. When they are laid out they are simply a flat piece of steel with a half circular hole punched on one side. We drill a hole in six seconds.

Mr. Otto:—We had considerable trouble getting a flue sheet cutter that would cut as fast as we thought it ought to. We use a spiral cutter with a pilot. We make them ourselves, and they give better satisfaction than anything we have had and will stand more abuse without breaking.

Mr. Thomason:—We are using a sort of twist drill with a

removable soft steel shank and a pilot. We punch an inch hole into which the pilot just fits.

Mr. Sterner:—We punch a $1\frac{3}{8}$ -in. hole and use a high speed twist drill, drilling about 85 holes an hour.

C. W. Irving (G. C. & S. F., Cleburne, Tex.):—We have a cutter with a $\frac{3}{4}$ -in. pilot.

Mr. Martin:—We have a cat head tool with two small cutters.

Mr. Lugger:—We have always used a cat head cutter. It has a guide made of an old tap and a drill on the end, so that it can drill its own lead hole and then cut the flue hole. We have always been able to do the work in from 30 to 35 seconds per hole.

Mr. Meitz:—That is the cutter we use, except that we punch the flue sheets and use a rose reamer. We make 255 holes in about 3 hours and 55 minutes.

Mr. Martin:—With the two-cutter tool the strain is equal on each side of the pilot. If you have a three-wing cutter it is a hard matter to get all three of the cutters cutting even. I have tried them both and have done away with the three-wing cutter.

Mr. Meitz:—I agree with that for the heavier jobs. The three-cutter tool is the best for flue sheets because of lost motion on the head of the radial drill. When you grind the cutter straight on the bottom, you have all three cutting edges alike and there is no vibration in it.

Mr. Lugger:—It is almost a necessity to have three cutters for accuracy, but for speed two will do better.

Mr. Sterner:—When you go home put a high speed twist drill in your drill press and speed it up, and you will find that you will drill two holes to the one you are doing now. No cutter ever made can compete with it.

Mr. Fuhrman:—We punch an 11-16 in. hole. The layer-out is careful to get his centers all in line. We have a small rose bit reamer under the pilot. If one lip of the cutter cuts a little harder than the other it does not make any difference; you get a true hole and get it right where you want it. With the twist drill a little strain one way or the other will make a difference. I prefer a tool that has a pilot with a close fit.

C. A. Cook (C. I. & L., Lafayette, Ind.):—I am up against the proposition of cutting flue holes $5\frac{1}{2}$ in. in diameter. What style cutter is used for that?

Mr. Martin:—We block up under the sheet and use a two wing cutter, and do not have any trouble.

Mr. Hendrickson:—I have a four-cutter tool, the cutters being adjustable. Two of the cutters are ground to cut on the outside and two to cut on the inside. In the center of the cutter is a twist drill, No. 3 shank. We drill the hole and the drill forms the pilot. The cutter is easy to repair, and nothing can break but a little piece of steel.

Mr. Pike:—We make one of our cutters with a round nose and the other square, the round one in advance.

Mr. McKernan:—Up to five years ago we made a cutter with a pilot in the center and two blades inserted parallel to the shank, but we found by taking a piece of high speed steel 2 in. long and milling it similar to a twist drill, putting a pilot 3-16 in. diameter on the end, that we were able to drill through a $\frac{1}{2}$ -in. sheet in 20 seconds.

MAKING OF DRILLS.

George F. Linck (Houston & Texas Central) presented a short paper on the making of drills, from which the following is taken. "We have stopped making twist drills with the exception of those for special jobs, but we are making a good many straight, flat shank drills of high speed steel. For example, take a 1 1-16 in. drill made from $\frac{3}{4}$ in. round bar 8 in. long over all, allowing $3\frac{1}{2}$ in. for the shank. This piece of steel is flattened out to about $\frac{3}{8}$ in. thickness at the shank end, tapering down to about $\frac{1}{4}$ in. thick at the point. The tool dresser can easily forge one of these in a very few minutes, the steel weighing about $\frac{3}{4}$ lb. The whole cost is less than 75 cents, as compared with about

four times that amount for factory made drills, according to catalog prices. We have tested these drills by drilling through 3 in. soft steel in 1 minute 29 seconds—240 revolutions per minute—leaving the hole in good condition for any ordinary purpose. We have cut the time of drilling flue sheets from four days, to only nine hours, by using a combination flat drill of high speed steel with a 13-16 in. rose bit reamer on the end. This drill has been in use for over three years, and is in very good condition yet."

DISCUSSION.

Mr. Martin:—We make our own flat twist drills. The labor cost on the drill— $\frac{3}{4}$ in. to about $1\frac{1}{4}$ in.—will be only about 52 or 53 cents. We have obtained excellent results from it.

Mr. McKernan:—Up to a short time ago we made a flat drill, but I do not think it is accurate enough for ordinary work.

BOILER TAPS.

The standardization of threads for boiler work and the merits of the V-thread, Whitworth and United States standards were discussed at length. Most of the roads have adopted 12 threads to the inch, 1-16 in. taper to the inch, or $\frac{3}{4}$ in. to the foot. The members generally favored the Whitworth thread for boiler work. The taps last longer and staybolt breakage is less with the Whitworth than with the V-thread.

TEMPLATES.

F. W. Lugger (Big Four, Delaware, Ohio) emphasized the necessity of promptly providing templates for repairs to new classes or types of locomotives. He presented a drawing of a template for laying off the cylinder saddle (Fig. 16) to fit the arch of the boiler.

It can also be used to advantage where the application of one or a pair of cylinders is required without changing the position of the frames at the rear part of the boiler. The base of the

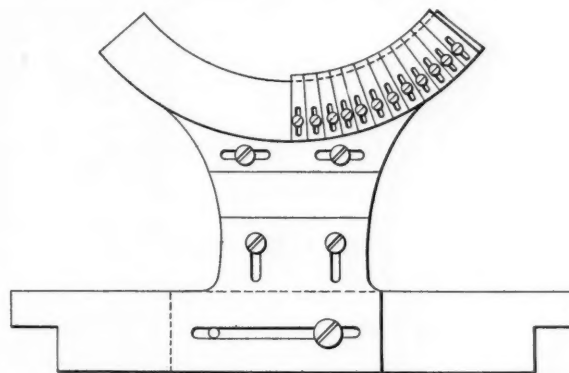


Fig. 16—Template for Laying Off Cylinder Saddles.

template being adjustable, allows it to be set on the frames where the cylinder must rest. The body of the template has room for adjustment to the height of the saddle, and the different lips can be adjusted to the exact shape of the boiler arch. The lips necessarily have to have sufficient range of adjustment to apply to the smallest, as well as the largest boiler; in case of the larger arch, a small gap will be found between the lips, but that can easily be taken care of. The arch piece must have lateral adjustment, in order that it may always be placed in the center of the template.

DISCUSSION.

Mr. Martin:—An accurate drawing and an accurate method of laying out work is in some cases better than a template, especially if it is constructed of some flexible material that is not very reliable. I recommend its nearest kin—the jig—wherever it can be used. For large work where a jig cannot be used the template is the next best thing.

mixture, which is a good quality of grey iron with about 22 per cent. to 28 per cent. of steel cuttings poured into the ladle and stirred just before pouring the metal into the molds. This gives a very much tougher iron and is more serviceable for forging machine dies than ordinary grey iron castings; such castings can be obtained at approximately $2\frac{1}{2}$ cents to 3 cents per lb., and have the further advantage of being available on comparatively short notice. The die block pattern can be quickly made and very often the foundry can pour the casting within 24 hours after it is ordered, whereas it sometimes requires from 1 to 3 weeks to get the forged steel blocks. Heading tools which have a tendency to wear rapidly should be made of a very high carbon steel. However, in general practice this precaution is not necessary. The heading tools should be rough forged and annealed.

After the die blocks are finished to size they should be taken

breaks easily. Nickel steel is stronger, and will stand more than the common tool steel will.

President Bray:—We use old open hearth steel driving axles for forging our dies and caseharden them. We seldom have any trouble with these dies. For the plunger we use a high grade of steel. We tried cast iron, but had very little success; that is, with dies that had to be used a great deal.

Mr. Martin:—I do not believe that it pays to make cast iron dies, if it is necessary to put much labor on them. Cast iron dies for a few forgings that are not very complicated might pay.

Mr. Pike:—Frequently we perform a great deal of labor in making a pair of cast iron dies, and when they are finished discover a blowhole in a very unfortunate place. We decided that cast steel was the proper material to use. It is durable and can be repaired without any great cost. We have had trouble in mak-

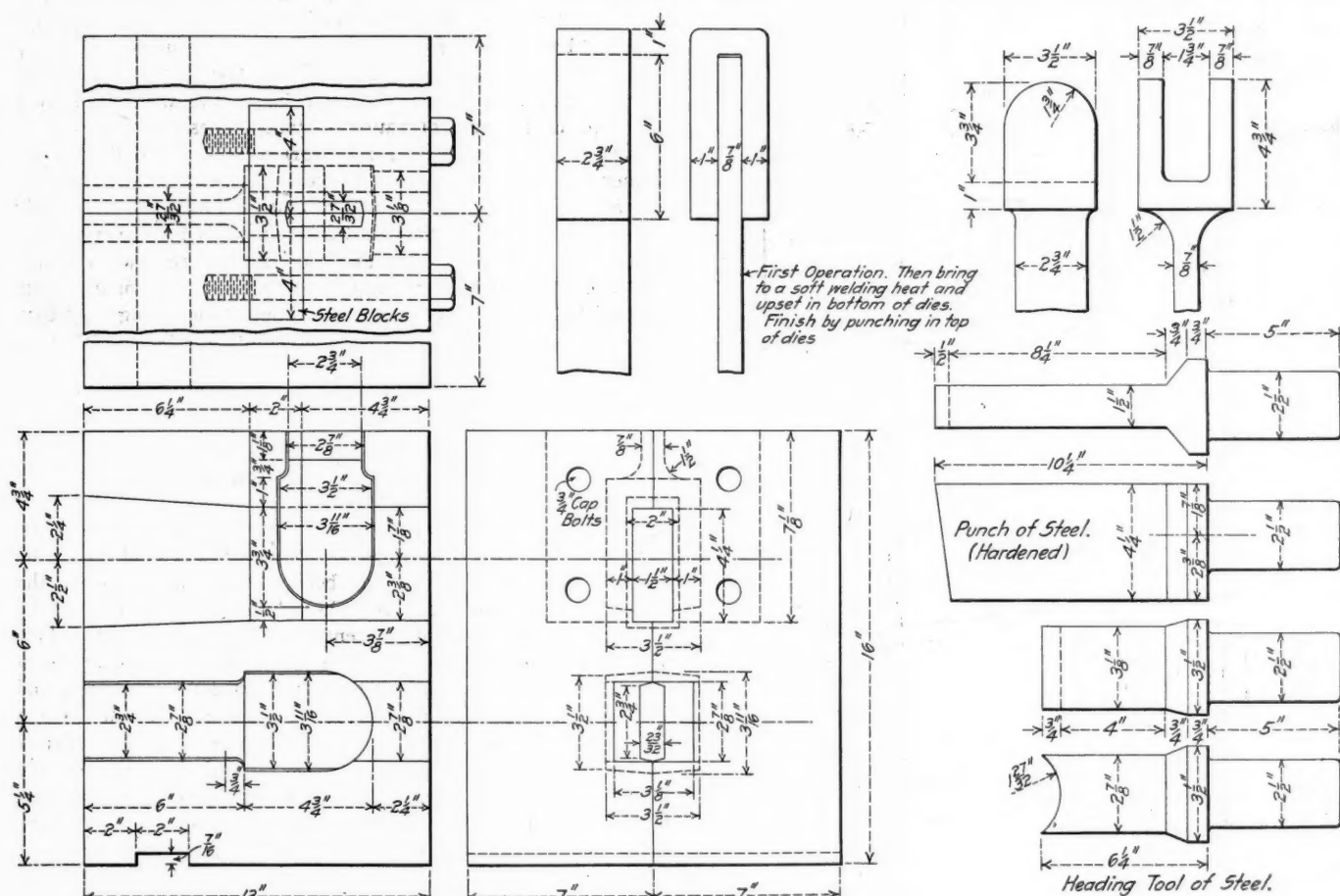


Fig. 18—Dies for Forming Jaws on End of Bar.

to a layout table and have the form laid out in accordance with the drawing. The round grooves in the dies can best be machined on a universal miller and a great many recesses into which the stock is to be upset can also be machined in a miller to a better advantage on any other machine tool. After the die blocks and heading tools are machined they should be hardened. Each die block should have a hole tapped in the top of the face so that an eye-bolt can be screwed into it, thus facilitating handling it in and out of the forging machine.

DISCUSSION.

Mr. Pike:—We have about the same practice, except that we use a cast steel block for the base of the die, and high carbon steel for the die itself.

Mr. Hendrikson:—Dies that we use a great deal we make of cast steel. For plungers we use an old driving axle. No matter what you put in a plunger, it is bound to crack on the face in the course of time. For small plungers we use tool steel. It

ing the grate shaker rest with a taper socket. After making about 100 the corners have rounded considerably. We are trying out dies of high speed steel. The first ones we made too light in the socket and held too rigidly, and they broke off; the second ones we made with good generous fillets in the corners, and they are standing up well.

Mr. Hendrikson:—I have used a low carbon steel and a common tool steel plunger; they have been in service a couple of years and seem to be all right.

Mr. Davis:—We tried high speed steel for the plunger, but it was not successful. Carbon steel has given better results than anything we have used. The Interstate Commerce Commission requires all brake staffs to be made without a weld. You have to upset 11 in. We tried a high speed steel ram and thought we could do it all at one stroke, but found it impossible, and are doing it now with two strokes. The high speed steel did not stand up. With one stroke the carbon steel did better than the

high speed steel. We use cast iron where we do not have many pieces to make.

Mr. Otto:—We use steel castings for lots of dies; also steel and axle steel. The rams we make of carbon steel.

Mr. Purchase:—We make all our dies of axle steel.

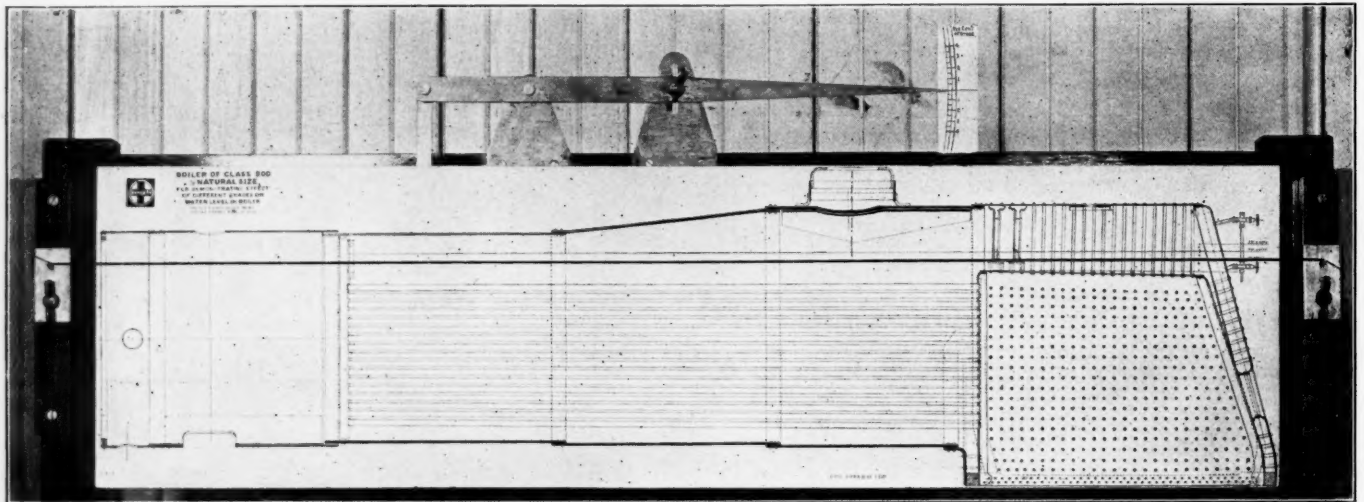
Mr. Fuhrman:—How about tempering the dies?

President Bray:—We use axle steel and case harden.

Mr. Pike:—We do not temper them. I have tempered them, but it is very plain that the white hot metal remains in the die long enough to destroy the fine points, and we are liable to lose

The exhibitors were given a vote of thanks for their efforts to make the convention a success. A list of the exhibitors and a description of the exhibits will be found in the *Railway Age Gazette* of July 14, page 90.

The following officers were elected: President, E. J. McKernan, Atchison, Topeka & Santa Fe, Topeka, Kan.; first vice-president, J. Martin, Big Four, Indianapolis, Ind.; second vice-president, G. W. Jack, Illincis Central, Burnside shops, Chicago; third vice-president, A. R. Davis, Central of Georgia, Macon, Ga.; secretary-treasurer, M. H. Bray, New York, New Haven



Water Level Indicator at Zero Grade.

the die. We think it is more profitable not to temper them, and when they are dull to sharpen them. I do not think it best to temper the ordinary die.

Mr. Martin:—I do not think that it is practicable to temper some dies. It is not necessary to temper the die block all the way through; the face is all you want hard. Whenever it is possible I think the die block should be tempered, as it prolongs the life of the die.

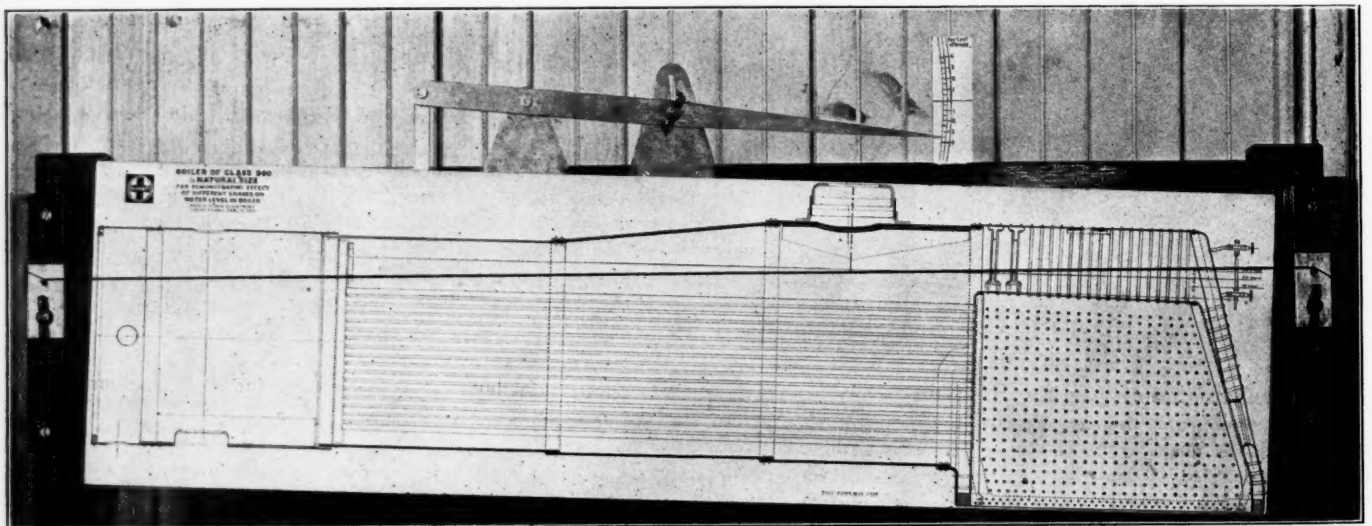
OTHER BUSINESS.

The secretary was instructed to invite the General Foremen's Association, Master Blacksmith's Association, Master Boiler Makers' Association, Master Mechanics' Association and Master Car Builders' Association to have representatives attend the meeting next year. It will be in Chicago, opening the second Tuesday in July.

& Hartford, New Haven, Conn.; chairman executive committee, August Meitz, Pere Marquette, Grand Rapids, Mich. O. A. Dollman, Pennsylvania Railroad, Chicago, and E. R. Purchase, Boston & Albany, Springfield, Mass., were also appointed members of the executive committee.

MODEL FOR INDICATING WATER LEVEL IN LOCOMOTIVE BOILERS.

A device showing the distribution of water in a locomotive boiler while on different grades is used by the Atchison, Topeka & Santa Fe for the instruction of its enginemen and firemen. It consists of a frame, to which a blue print of any boiler may be attached. The frame is pivoted at its center of gravity, which allows the model to be swung at any vertical angle. An indicator is connected to the frame, through a system of levers and shows, on a suitable index, the corresponding grade to



Water Level Indicator Set for a 3½-Per-Cent Ascending Grade.

which the boiler center line conforms. A string is stretched across the boiler drawing, so arranged as to be parallel to the center line of the boiler when the indicator reads zero. This string may be raised or lowered to any desired height showing the different water levels in the boiler.

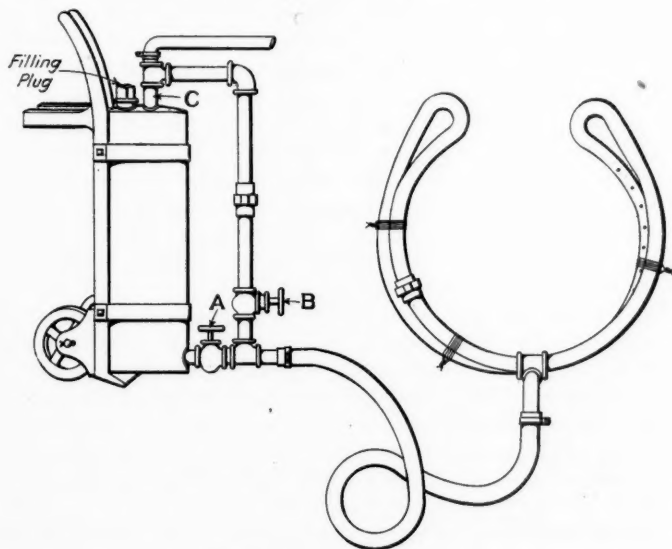
With this arrangement the engineer may set his boiler to the maximum grade he runs over on his division, and by raising or lowering the string can determine the minimum amount of water allowable, as shown by the glass or gage cocks, when passing over this grade, and in this way can assure himself that his crown sheet is completely covered at all times. The device has proved successful, and the engineers have considered it carefully, often times remarking that they would thereafter carry more water in the boiler when passing over certain points in the road. It has proved of great advantage in the mountainous districts where the grades sometimes run as high as 3 to $3\frac{1}{2}$ per cent. The accompanying illustrations show this model with boiler in the level position and on an ascending grade of $3\frac{1}{2}$ per cent. The model was originated by W. F. Buck, superintendent of motive power of the Santa Fe, and will be on exhibition at the next Traveling Engineers' convention in Chicago.

TIRE HEATER.

BY W. W. REEVES,

Machinist, Illinois Central, Burnside Shops, Chicago, Ill.

The principal features to be considered in the construction of a tire heater are simplicity and cost, and the accompanying illustration shows one which may be easily made in any locomotive shop. The absence of reducing valves, check valves, perforated mixers and other special devices will be noticed. These fixtures only tend to complicate matters and present just so many more chances for leakages, disorders and the like. This tire heater consists of a double ring of $2\frac{1}{2}$ -in. pipe, arranged side by side, bent to the desired diameter and bound by wire to prevent them working apart and breaking. Loops are used



Portable Tire Heater.

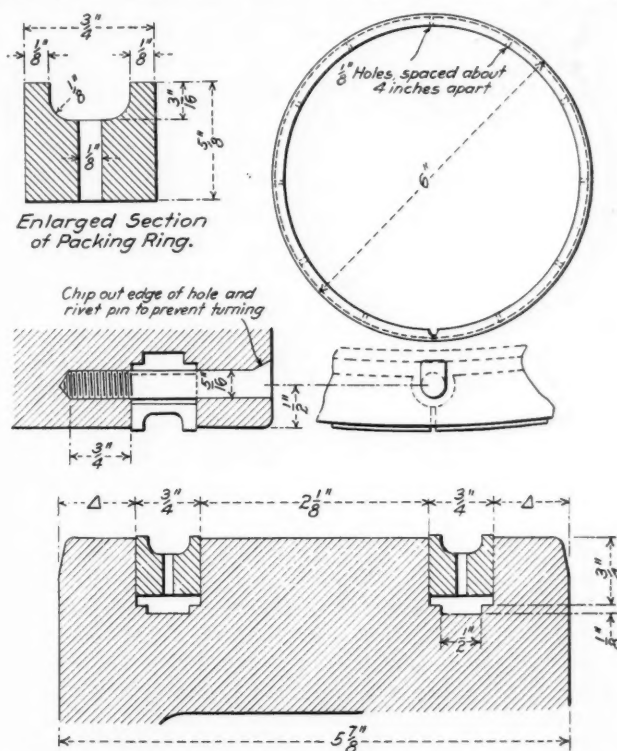
at the ends, which limit the joints in the ring to a union, with an asbestos gasket and a tee connection to the supply tank. Holes $1/16$ in. in diameter are drilled in the inside pipe only, and at intervals of 3 in. to within one-third of the top of the ring. The outside ring is used to heat the gas, which aids its combustion as it leaves the holes on the inner ring. The holes in the top third of the ring are omitted to prevent overheating the adjacent parts of the locomotive, the heat from the lower flame jets being sufficient to heat the whole tire. With this arrangement no jackets are necessary except to protect the paint

on the cab. All scale and dirt should be removed from the pipe before using, and all the holes should be left open and free.

The oil tank shown is made from an auxiliary reservoir of about 10 or 15 gal. capacity, and is fastened to a truck to provide a means of easy transportation. It is set in an upright position while being used. The air enters the top head at C, and also passes around from the tee to the air valve B, controlling the air supply to the feed pipe, which is located at the bottom of the tank just far enough above the bottom head to eliminate the chance of drawing any sediment into the heater ring. By regulating the air and feed valves the desired mixture may be obtained. The oil should be regulated through a needle valve as a more even distribution may be attained. Care should be taken that a correct mixture of oil and air is obtained, as considerable waste of oil may be eliminated and a hotter flame maintained. The heaviest tire should be removed in 20 minutes with this apparatus, and thin tires in 10 to 15 minutes. This device has been in successful use on the Illinois Central.

CYLINDER PACKING RING.

The cylinder packing ring shown in the accompanying illustration is used on the Baltimore & Ohio, and is a modification of the Leighton cylinder packing ring, as used by the Illinois Central, and described in the *Railway Age Gazette* of May 5,



Cylinder Packing Ring Used by the Baltimore & Ohio.

page 1057. The difference between the two is in the width of groove and the arrangement of the holes. As used by the Illinois Central two sets of holes are drilled, one through the ring and the other at right angles to the bottom of the groove through the side. This arrangement was first used by the Baltimore & Ohio, but the side holes were found to be unnecessary and the ring as shown herewith was adopted. This road also found that by the use of this ring, the number of cylinders requiring reboring on account of the high pressure under the ring was greatly reduced.

Sanction has been accorded to the construction of a branch line to serve certain coal properties lying between the Barachuck branch of the East Indian Railway and the Sanctoria branch of the Bengal-Nagpur Railway in the Sanctoria coal fields.

GENERAL FOREMEN'S ASSOCIATION

The seventh annual convention of the International Railway General Foremen's Association met at the New Sherman Hotel, Chicago, July 25, 1911. C. H. Voges, Big Four, Bellefontaine, Ohio, presided. After a prayer and the singing of America, Edward T. Wade, assistant corporation counsel for Chicago, welcomed the convention to the city in behalf of Mayor Carter H. Harrison, who had left the city for a much needed rest after two rather severe campaigns. T. H. Ogden, of the Santa Fe responded, thanking Mr. Wade. The report of L. H. Bryan, the secretary, showed a membership of 215 and a splendid balance in the treasury. President Voges made an address in which he emphasized the necessity of every member being a live wire. The convention held two sessions for each of the three days it was in session. As may be seen the entire time of the convention was taken up in discussing various phases of the shop efficiency problem. In addition to the reports three addresses were given as follows: Tuesday afternoon J. F. De Voy, Wednesday afternoon H. T. Bentley, and Thursday afternoon Dr. Angus Sinclair.

MR. DE VOY'S ADDRESS.

James F. De Voy, assistant superintendent motive power of the Chicago, Milwaukee & St. Paul, addressed the association at the Tuesday afternoon session. He congratulated it on the splendid increase in membership since the last meeting he had attended, and emphasized the necessity of thoroughly investigating various methods of shop practice and recommending standard practices.

MR. BENTLEY'S ADDRESS.

H. T. Bentley, assistant superintendent motive power of the Chicago North Western, and president of the Master Mechanics' Association, addressed the convention on Wednesday afternoon. He said among other things: I do not believe the majority of our general officers appreciate the work that the general foremen are doing. Having been in that position and having had some of the best general foremen in the country under me, I can truthfully go on record as stating that a first class general foreman is one of the greatest helps a superintendent of motive power or his assistant can have. What are the duties of a general foreman? That is easy. He has got to do everything. The emergencies that frequently come on a big railway make it necessary for a general foreman to do a little bit of everything. He has to be a very active man.

I notice a good many of the supply fraternity among the audience. In the olden times a supply man was considered to be—well, they put up with him and that was about all. He was considered a necessary evil, and when he came around to spread the glad tidings of a new tool or something of that sort, sometimes they would speak to him, but often I have known them not to do so. Nowadays the supply men are doing wonders. The general foreman and every mechanical officer ought to be very grateful to them. I generally try to give the supply man a little chance to show what he has got and say his piece. This country is pretty large and we are pretty small. As general foremen we cannot get over the country as we should do, and as we ought to do, but the supply man is here, there and everywhere. It frequently happens that one will come into my office and say: "I was down to so and so's and they have the slickest way of planing up shoes and wedges you ever saw. Do you know anything about it?" If I do not I usually get right after it. Go to a supply man who is furnishing a lathe, or a drill press, or whatever you need. You want one to do a certain kind of work that your own machines or the machines on the market are not fully covering. He will often make a good suggestion to you and will make the machine so that it will actually fill your requirements. If he knows of such a machine, even if

he is not selling it, he will put you next to the man who is selling it. He wants everybody to know the good things that are going around, and we owe a debt of gratitude to him for the information that he furnishes us, and the way in which he takes up any suggestions that we make for the betterment of the tool he is selling. The exhibit that I have just had an opportunity of looking over makes me realize the importance of a gathering of this sort. I presume there are a lot of men in this association who never had an opportunity of seeing so many exhibits under one roof. It would take them several weeks, and they would have to go to several places to see the things that are so generously exhibited here.

There is another class of people to whom we owe a debt of gratitude, and that is the men who represent the railway mechanical papers. I hope that all of you general foremen, if you intend being anything more than general foremen, are subscribers to mechanical papers. If not, you ought to be. I have a number of mechanical papers coming to my house every month, and I get some of the most valuable information from these papers that is possible to imagine. You get information from all over the world. With the supply men you get it locally, or from the United States, but with the mechanical papers, if you get the right kind, you get it from all over the world, and you get acquainted with what others are doing.

Some people say that we are not getting the results that we ought to, and I do not believe we are. But if we analyze the things that the mechanical department is doing, we find it is about keeping up with the pace. A few years ago we had 17 in. engines to repair in the shops; the men would get the blocking, jacks and bars, and would finally get the engines up and the wheels out. The engines gradually got bigger and heavier, and it necessitated heavier jacks, heavier lifting mechanism and heavier tools to do the work. Today the tremendously large locomotives are repaired just as quickly, or more quickly, than the 17 in. engines were 30 years ago, because everybody has kept pace with what is going on.

I want to talk to you particularly about getting results. What are general foremen for? What are master mechanics for? What are roundhouse foremen for? What are assistant superintendents of motive power for? They are here to get results as a business proposition. The companies pay the men a certain compensation for doing certain things. Are we earning the money that is paid us? Are we getting the results that we ought to get? I believe that by your attendance at this meeting you are doing more to earn your salary, than you would by sitting in your shop for six months. We do too much staying in our own shops. To get the best results you have got to see what the other fellow is doing once in a while. Unfortunately, in my position I have not been a very good traveler to see what the other fellow is doing, but I have instructed our general foreman and his assistants that they must go out once a month to see what the others are doing. To illustrate the importance of this, we were working on a little proposition, but were going about it left handed. It was suggested that our foreman boiler maker find out how it was being done somewhere else; we found another shop had us skinned a mile. Other people come to our shop and probably get pointers about short cuts. There is no question but that some of you gentlemen who are members of this organization are up against a hard proposition that some other fellow has overcome. It saves a lot of trouble, time and expense if you can get that information from the other fellow, not forgetting that when an opportunity presents itself you must do as much for him. We cannot afford to be selfish in this business.

How can a shop foreman best promote efficiency. As I read it, that is just exactly the same as getting results. That is what we are after. You men who never take a mechanical paper

and who sit in your own shop and think you have the best of everything are back numbers. You have got to read; you have got to exchange ideas; you have got to see what the other fellow is doing. My advice to a man who wants to succeed is, work hard and work constantly. It is no use working hard and doing nothing. I know lots of people who do that, but you want to work hard and get results; read all the books and papers that treat on the subject you are interested in, and in case you want a little recreation, take a visit to one of the other shops and see what they are doing, and attend gatherings such as we have today.

R. V. Wright:—In behalf of our association, Mr. Bentley, I want to thank you for the inspiration and advice that we have received from your talk. We are sorry that mere words cannot translate the appreciation and the spirit of the applause which has just greeted you. There are two reasons why we are glad to have you with us this afternoon: In the first place we have been discussing the subject of shop efficiency since yesterday morning. One of the important points which has been brought out is the necessity of having a man with a strong personality and magnetism at the head of our shops and departments. One reason that we are glad to see you is that we realize that from the time you started in as a machinist at the Chicago shops until the present, when you hold a most important position in the mechanical department of your road and have been honored by your fellows in being elected as the head of the American Railway Master Mechanics' Association, a great deal of your success has been due to your strong personality and magnetism. We wanted to get you up here so that we could if possible get some idea of what that personality and magnetism is.

There is another reason why we are glad to have you with us. During the last few years the Master Mechanics' and the Master Car Builders' associations have found very little time to consider subjects pertaining to shop management, shop organization, shop efficiency and shop methods. They have given time to the consideration of the construction and arrangement of shops and things of that sort, but they have not gotten down to the heart of shop organization and management, and possibly never will, for they have larger problems to contend with. They have Uncle Sam to think of, safety appliances and boiler inspection, and they have large problems in the management of the mechanical department as a whole. Our superiors hold us responsible for the efficiency and output of our shops, and it is up to the general foreman and the foremen of the various departments to bring that efficiency up. Inasmuch as the larger mechanical associations cannot find time to take up this work, it devolves upon associations such as ours to study, to discuss and to try to bring out those good things in organization, supervision and methods which will help to bring our shops to the very highest point of efficiency, and to make the output as large as possible with the facilities that we have at hand. Inasmuch as this important work, which cannot well be handled by the more important associations, has devolved upon us, we feel that just as it is necessary to have co-operation between all the departments of a railway shop to get the best results, so these various organizations ought to co-operate more closely. Speaking to you as president of the Master Mechanics' Association, I think members of the association would like to have you consider this problem, talk it over with the executive committee of your association and see if it is not possible for us to assist your organization by handling some of these specific problems and by making reports to them of our findings, thereby getting closer together.

Mr. Bentley:—I will be very glad to bring up the question of asking the General Foremen's Association and kindred associations to dig up some of the details that the Master Mechanics' Association does not have time to dig up. I believe that the General Foremen's Association will do the work well, and it will certainly relieve our association of a lot of detail work that we are not competent to take care of.

DR. SINCLAIR'S ADDRESS.

Dr. Sinclair commented on the growth of the association, and especially dwelt on the difficulties encountered during its early history, at which time he had been able to be of considerable assistance to it. He also spoke on the history of the development of machine tools and shop kinks.

HOW CAN SHOP FOREMEN BEST PROMOTE EFFICIENCY?

F. C. Pickard, master mechanic of the Cincinnati, Hamilton & Dayton, prepared a paper on this subject, which is certainly unique, as compared with reports ordinarily presented before railway mechanical associations. By study and correspondence with the members of the association he arranged 44 questions under four heads—organization, accounting and supervision, handling of material, and shop kinks and methods. The questions were intended to cover all of the important duties which come under the supervision of the general foreman and which effect the efficiency of the shop. In introducing the subject Mr. Pickard said that the average general foreman was the best efficiency engineer that could be found. The report had been sent to the members with the request that they come prepared to discuss such parts as they were specially interested in.

The program called for four committee reports, but two of the chairmen fell down on their jobs. The report of the shop kinks committee dovetailed with Mr. Pickard's report on promoting efficiency, so that practically the entire time of the convention was given over to this subject. In our report the discussion has been carefully arranged under the various heads. Each section is preceded by the questions asked in the report, and then each one on which there was any discussion is considered separately. The limited amount of time of course prevented a thorough discussion of all the topics, indeed some of them were not considered at all.

ORGANIZATION.

What plan of organization do you find to be most effective?

Do you find that strong leadership, force of personality and a way of doing things will accomplish much?

That the test of an organization is to maintain efficiency during the absence of a unit?

Should mechanics be paid according to their merit, or should they all be compensated alike?

Is it not an incentive for mechanics who are working for a small compensation to endeavor to reach a higher rate of pay?

Who gains by the step rate of pay?

What method of organization have you in vogue in your shop? Is it effective?

What constitutes a good organization, and do you not find that the underlying principles of good leadership, team work and enthusiasm have a good effect?

What effect does it have upon the mechanics to take officers and foremen from the ranks?

What should be the relation of officers to subordinates?

Young men and responsibility: What is their ability in the direction of foremen and executives?

In opening the subject Mr. Pickard said: We cannot accomplish very much unless we have the organization arranged in complete detail to begin with. We would like to know the type of organization that you find most effective in your shop, not only in a general way, but for the various departments. I went into a shop the other day and saw a tinsmith putting in a front end. In another shop the boiler makers put them in at about 25 per cent. increased cost in labor. The fellow with the tin shop

proposition is getting more for his dollar. Under the present labor conditions, these are points well worth looking into by the general foremen.

What plan of organization do you find to be most effective?

William G. Reyer (N. C. & St. L.). Within the past year I took an extensive trip, visiting a large number of railway shops in this country and Canada. Before the trip we were handling eight or nine engines a month. After my return, I changed the plan of organization, and in the month of June we handled thirty engines, of which fifteen were overhauled. The rest were light and heavy repairs. We did not engage an extra machinist. The force was nominally the same as it was when we were handling the smaller number of engines. I bring this out to show the force of improved organization. The management allowed me to appoint an assistant foreman. The gang bosses have special duties and report to the assistant general foreman.

We have specialized our work to a great extent. Formerly a man would have guides to set today, tomorrow he would work shoes and wedges, the next day he would have valves to face, and the next steam pipes. We have stopped all that, and each man has his special work to perform. He is generally assisted by an apprentice and a handy man. We had fifteen pits. I closed three to make room for other work, and feel that we get better results than from the fifteen. Each man on the machines has a special class of work to do.

L. O. North (Ill. Cen.):—Our policy as nearly as I can explain it is a co-operative one with the men and the foremen. The general foreman of the locomotive department reports directly to the shop superintendent. The general foreman of the transportation department reports directly to the master mechanic. Under the supervision of the general foreman of the locomotive department is the machine side foreman and erecting foreman with seventeen gang foremen. The blacksmith shop has a foreman and two assistant foremen. The tin shop has a foreman and three assistant foremen. The boiler shop has a foreman and six assistant foremen. This works very satisfactorily, and there is no discord of any kind between any of the foremen or of the men employed. This is best illustrated by the action taken by the different foremen who assist each other in different ways. If one foreman notices something out of the ordinary that would be apt to cause a delay to the work of the other foreman, he takes it upon himself to consult with this foreman so as to assist him as much as possible, realizing that this is for the common good of all.

The transportation department, which controls the engine house, co-operates with the back shop, and if there is any work in the back shop which this organization is in need of, the general foreman consults with the back shop general foreman. By so doing we get very satisfactory results. The work performed by the engine house consists of light repairs and running repairs with a few general repairs in between. The special work on these engines, except for the actual erection, is done in the machine shop. This works very much more satisfactorily than it would to have each individual work on the engine in question and repair all of the special work, such as the steam chests, rocker boxes, links, cab work and other parts.

We have made satisfactory and thorough tests of specializing work as much as possible, and have installed this system wherever practical. We have a rule that when a specialist has been on a job six months and desires a change to become familiar with other work, it is granted to him. This will mean in time, as the men have been shifted from one position to another, that they will practically become experts on any part of the locomotive. We will have men that we can place on any job and who will give us the best possible results.

Another system which gives good results is a weekly sheet or schedule which is compiled on a certain day once each week in the general foreman's office by the general foreman, boiler foreman, erecting side foreman and machine side foreman. It

shows the pit number, engine number, date in shop, date boiler to machine shop in case of firebox work, date boiler ready for pressure, date wheels and boxes ready, date engine on wheels, dates valves set and engine on trial. By using a schedule of this kind we obtain satisfactory results in a great many ways. Each department thoroughly understands when its work on the locomotive must be ready for the erecting side. Formerly confusion resulted from the number of engines in the shop and the number of pieces at the different machines, the foremen not knowing which pieces to finish first. With this schedule these foremen know which piece to have ready first and there is no chance for an argument between the different departments as to who shall have the preference in the completion of the particular work, either in the bench gang or on the machine side.

We have twenty-five pits at the Burnside shops; one is used for stripping the engines for the boiler shop. We have four machinists and four helpers in the stripping gang, with one foreman in charge, who has additional duties assigned to him from time to time. This gang strips two engines complete for the boiler shop each week. They also handle odd jobs from time to time, as we find it necessary to use them on other pits to strip other engines than the ones assigned to the regular stripping pit. This is brought about by the pit men following the engine they have overhauled to the roundhouse to complete it, and also to do necessary work after the trial trip. As the pits are kept filled with locomotives, this would leave the pit practically unprotected. By using the stripping gang for this purpose the work is taken down and distributed much more promptly than could be done in any other manner. As the work is stripped it is placed in a pile at the rear end of the pit; it is then taken by a gang of laborers to the lye vat, and thoroughly cleansed and distributed to the different departments which handle each class of work.

T. H. Ogden (Santa Fe):—The best form of organization depends entirely on conditions. There are too many men who have not confidence in the foremen under them. They will go to a man doing a certain class of work and say, "Don't do it that way." Do not interfere with your foremen. If they are not competent, get others. I want a man competent to take my place if I should be gone for three or four days. Have confidence in your men and appreciate the work they do for you. There are too many of our foremen who do not appreciate the men's work. Let us try and measure out a little of the milk of human kindness. That is necessary in a shop. We cannot succeed without the men behind us.

F. C. Pickard:—The first thing to take into consideration is the local conditions and the environment. An organization is similar to a large gear wheel. The general foreman is the axis upon which it swings. If there is one irregular tooth in the gear the organization is not going to move smoothly. If there are two, it is a whole lot worse. If three are out and you do not have somebody to fill in, you are gone. You must have a man to bring in in the absence of the unit. As a general plan, dependent on the number of men employed, a good organization would be to have a general foreman who would have entire supervision over the shop. I do not believe one gang foreman should have over six pits. The machine foremen should be based upon the same methods of output. In turn each one of these men should have their forces so organized that in case they must be absent, right-hand men are available to take their places.

T. F. Griffin (Big Four):—Referring to the engine house. The boiler foreman should have charge of the boiler makers for the washing out, staybolt testing and hydrostatic tests required by the government. He should have a complete record, and if called upon by the claim agent should be able to give the exact state of any engine on a certain date. Have inspectors, both for engines and for air. Our engineers nowadays depend only on the inspector, and if we have a poor inspector

we will have failures, and a failure nowadays is a disgrace. To overcome the failures we should have good inspectors and have the machinists manifest enough interest to see any defects and report them. We should have good hostlers, who will get the engines in the engine house as soon as possible. After the engine is in the house, the inspector reports to the roundhouse foremen and they distribute the work to the men. Any failures after the engine leaves the shop and goes out on the road are referred to the inspector.

T. H. Ogden:—We make the hostler or roundhouse clerk an assistant to the round house foreman. He takes care of the blackboard in marking up the engines and starts them going; the roundhouse foreman tells him when he can have an engine and when he cannot.

W. W. Scott (C. H. & D.):—The success of your work depends upon how you are organized. The general foremen must possess a knowledge of roundhouse work, the despatching of engines, and some knowledge in a general way of all classes of repairs, so that he can pass on work from time to time. The responsibility of the shop rests on the general foreman. If there is any criticism, he is the man who has got to stand it. In our shop we have a general foreman and sub-foremen over all departments. Harmony ought to prevail. When you have men who cannot get along with one another, it is time to make a change.

William Hall (C. & N. W.):—The form of shop organization usually depends upon the size of the shop. If the shop warrants it there should be a general foreman, who should have supervision over every other foreman on the ground. He should have under him the machine shop foreman and the erecting foremen; they in turn will have their assistants, such as gang bosses. The roundhouse foreman, if the house is large enough, will want an assistant in order to enable him to conduct his business properly. The great difficulty comes from lack of supervision.

W. W. Scott:—I believe in building up the shop organization from the men in the ranks. I find this to be very effective in keeping up the "hope eternal" for better things which burns in the breasts of most men. Successful organization is kept alive by the relation which should exist between officers and subordinates. Do not erect any insurmountable barrier between yourself as general foreman and your men. You can command respect and still be tolerant to the point of good nature if you try. I do not place much confidence in the general foreman who struts around wrapped in the mantle of assumed dignity, and is a passing joke with the men on the job. I like to know my men personally and make it a point to be interested in my men's personal welfare, and I want to say it is an honest interest.

I believe in frequent meetings of the staff officers with the master mechanic as presiding officer. Many little kinks are straightened out at these meetings and much good has resulted on our road from it. I heartily recommend a card system in the general foreman's office covering data on locomotive repairs; this data being furnished by the roundhouse foreman, road foreman of engines, or from any other source possible. This gives advance information on actual conditions.

I also recommend and use a system of keeping in touch with repair parts. A card is put in circulation when an engine arrives in the shop. Inspection is made by the erecting foreman, who fills in the repairs needed and the time when the parts are turned over to the machine foreman. The erecting foreman retains the original and the machine foreman is given copy of the report. When the several classes of repairs are made the foreman checks off from the list until the work is completed. You can readily see how a foreman can keep in touch with his work by consulting his repair sheet and the erecting foreman and checking up daily without walking all over the shop to note the progress of the work.

W. Smith (C. & N. W.):—Some one has spoken of the lack of supervision in most organizations; that is a point that it

would be well to bring out, especially in the large roundhouses. Where there are forty or fifty stalls the roundhouse foreman is often expected to look after all the work. He is so busy he cannot gain the most efficient results. Some master mechanics seem to be averse to increasing supervision; they think it is non-productive. I think it is a mistake. The organizations in the roundhouses of the Lake Shore and Pennsylvania are ideal in this respect. They have a passenger foreman, freight foreman and boiler foreman—with the roundhouse foreman over all. The organization is ideal. Where the roundhouse foreman has everything to carry in his head he cannot give the most efficient results; he may overlook certain important work, with the result that engines go out and make failures. When the passenger foreman is in charge of such engines and is responsible for them, he can see that the work is properly done and can plan ahead.

J. A. Boyden (Erie):—In our engine house we have working leaders who report direct to the roundhouse foreman. We have a leader over the passenger department and one over the freight department; they report to the roundhouse foreman, and he to me. We also have engine despatchers; the roundhouse foreman has nothing to do with the despatching of engines. In the back shop we have an assistant to the general foreman, who handles all piece work. We have a system whereby each gang foreman, when he finishes his part of the work, sends a note to the general foreman's office, *i. e.*, "rocker box complete." It is thus easy to follow up all the separate parts of a locomotive.

W. C. Stears (C. H. & D.):—A general foreman should have an organization such that each foreman knows just exactly how far he should go and where the line is drawn between his department and the other departments. This facilitates the work in the shop considerably and eliminates work going out of the shop not up to standard, due to one man looking to another to take care of it.

J. Schlageter (Toledo Ter.):—We have only a little handful of business, but it includes everything. The foremen of the different departments attend weekly meetings in the general foreman's office and discuss various subjects. We find out a lot of things the general foreman would otherwise never find out. It is surprising how much good comes out in this way. The general foreman issues a shop list weekly, showing what should be accomplished by the following Saturday. It is typewritten and sent to each department head. Every man in the shop can see what is expected of him. You will be surprised to see how much it has accomplished. Diplomatic handling of men will certainly accomplish more than the headstrong man who wants every man to be his own way of thinking. He will never be a success. He cannot keep the men nowadays. Our master mechanic or myself can be gone a week, and when we return, are surprised at how much more has been accomplished than we thought could be done. A man must be gentle, but he must be firm. When he says, "yes," he must mean "yes."

U. T. Gale (C. & N. W.):—We have an organization of our foremen that meets once a week. Each one submits any shop propositions that he thinks worthy of consideration. We have a stenographer who takes notes of the proceedings, and a chairman, who, as a general rule, is the general foreman; he leads the meeting and directs the discussion on the various subjects. We find just where the weak points are as far as the work on hand is concerned. We come in touch with each other in that way and gain a closer understanding of the possibilities of what can be done. By these weekly meetings we perfect our organization in its details. We bring matters right before the various leaders of the different departments. They have a complete and proper understanding of the matter before it is passed along to the gang foremen, and then the gang foremen pass it along to the men. They have a regular programme or schedule arranged. This schedule is detailed among the individuals who are interested—I mean the workmen. We have leaders of the different groups of men and give to each one an understanding of the program for the coming week.

W. W. Scott:—Sometimes a foreman in his zeal to get out a certain class of work will criticize the tardiness of the other foremen. The pit foreman will have a criticism of the machine foreman for not getting out work; the machine foreman will put it on the blacksmith foreman, and the blacksmith foreman on the storekeeper, and so on down the line. If that condition is allowed to exist, you are going to get in bad. I find the best way is to make a systematic check on the work. When an engine arrives over the pit, we show on it the date in and the date at which it is to be out. The several foremen meet in consultation once a week, and the storekeeper is also called in. We find out what we have to do in the way of repairs and then prosecute the work.

Do you find that strong leadership, force of personality and a way of doing things will accomplish much?

W. W. Scott:—Men should be picked who will make strong leaders. They must be men of positive dispositions—men who will say, "I cannot do it"; not, "I hardly think it possible." The tendency of the present times among shop men appears to be a positive disinclination to assume responsibility. Working conditions in our railway shops have improved so rapidly that mechanics are well satisfied to stay at the work bench and leave the responsibility of carrying all the mechanical grief on the shoulders of the very small proportion of men who are inclined to advance in their several mechanical trades. This condition retards effective shop organization. Proper organization of your shop forces must be the key note of high efficiency in your shop methods. You may adopt any plan of organization you choose (your local conditions must govern in that respect), but whatever plan appeals to you most strongly you will find strong leadership absolutely essential at all times.

Mr. Pickard:—This question is a very broad one and is a great factor in shop efficiency. If a leader of any shop goes down through it with his hands in his pocket, the others are liable to do likewise; but if he sets a good example his men usually follow it.

W. D. Bunker (Col. & Wyo.):—A drone cannot lead men. A man who will step to the front and be ready and willing at all times to help out is the man that is necessary. We find in the western country that those are the people who handle the work.

H. D. Kelley:—Take any shop and just as you find the foremen, so you will find the work. If you have a man who is a real leader, it will follow all the way down the line. A leader must go ahead of the man in the shop, whether it is getting up shop kinks or getting to the shop on time. I was recently in a shop where they were getting out 200 engines a month. The man at the head of the organization got down at 7 o'clock in the morning, and he was out through the shop. Every man who held an official position was a wideawake one. The tool department had an excellent lot of tools and a system for handling them. On the other hand, I was in a shop not quite as large, where the work was of a different type entirely. You could go through the shop and note a lack of neatness, tools lying around and the men standing around talking. There were no kinks, and what tools they had were inferior. The foreman had none of the characteristics of the one described above. You may have the very best mechanics in the world, but without strong leadership, you are behind.

U. T. Gale:—While I believe that foremen should have a strong personality, there are various aspects that this personality should be considered from. In the first place a man who has charge of men should be loyal to the men who employ him, considering to the smallest detail their interests; then he should consider the men he has charge of. We should not lose sight of the fact that every man is a human being and entitled to consideration at all times. If things are not what they should be, we should be stern as far as the rules of the company are concerned. On the other hand we should be kind to the men and

make them feel that they are our equals as far as humanity is concerned.

L. O. North (Ill. Cen.):—I do not know of any one thing in the shop that has a tendency to bring out better results than encouragement, from the apprentices to the foremen. If they know that they are appreciated by the head of the organization, it has a tendency to inspire them in developing their ideas. We know that there are men who desire to hold back progress. They are to be found in any place. I think it may be easily overcome. When a man advances an idea, compliment him upon it and try it. It does not do any harm. It has a tendency to bring the foreman in closer touch with the men. The proper amount of encouragement at the proper time has as much to do with the successful management as any other feature.

That the test of an organization is to maintain efficiency during the absence of a unit?

F. C. Pickard:—I have seen organizations in which when a man stepped out, there was no one to take his place. That idea is all wrong. If I have a man to step into my place when I leave the office, so much the better for me, for the men, and for the company.

William G. Reyer (N. C. & St. L.):—With the organization we have in our shop I can leave at any time and it goes on as well as if I were there, if not better.

F. C. Pickard:—The weekly meetings are a splendid means of educating your subordinates to step in and do your work while you are absent. You impart to your men at that time just what you desire to accomplish, and it trains the next men in line to see what you want. Take your assistants freely into your confidence. We have these meetings in order to do so. We have in each gang a man who can step in and take the place of the gang foreman during his absence.

Member:—The best way to find out whether the absence of a unit affects the organization is by the unit absenting himself. We know under the old school that there was a great deal of jealousy; in other words, the man above was afraid the man next to him was after his job. It is for the man above to enlighten and educate the man next to him, so that if it is necessary for him to absent himself, things will go along as well or better.

W. G. Reyer:—We have a general foreman and an assistant. The assistant is in position to drop into the general foreman's place in his absence, and the work moves on just the same. There is always a machinist that can take the gang foreman's place. At such times we pay this man at the gang foreman's rate. Any man that is put into another man's place is paid his rate. We find the practice beneficial and it gives an incentive to do better. We have weekly meetings. Before these meetings we had a great deal of friction. They have brought the men together.

Should mechanics be paid according to their merit or should they all be compensated alike?

T. F. Griffin:—The man who does the work gets paid for it under the piecework system. We have not touched the piecework rate for the last five years. We have the piecework rates printed and placed where the men can find the rate on any piece of work at any time.

Young men and responsibility: What do you find is their ability in the direction of foremen and executives?

J. A. Boyden:—We have a system that gives the young fellow a chance. We take a fourth year apprentice and give him a chance at all vacancies. It gives us an opportunity to find out what sort of an organization we have. We work all piece work. If you give your young boys a chance, something to work for, something to encourage them, you will meet with very good success. We endeavor to keep our eyes upon the apprentice boys. If they know that they are going to get a chance, they will produce the goods. We have five fourth year apprentice boys acting as foremen in our shops.

ACCOUNTING AND SUPERVISION.

How do you arrive at the cost of locomotive repairs so as to know from day to day and week to week how much money is being expended on engines in the erecting shop?

Have you any system of arriving at the cost of each job?

Have you had any experience in the use of job numbers? If so, have the results obtained been satisfactory?

What system have you of acquiring advance information as to the repairs necessary to engines to be shopped at a future date?

What system of inspection have you for machine and erecting work? This applies particularly to steam pipes, nozzles, stand pipes and such other parts as are concealed when the engine is erected?

Have you any system of inspection of completed work in the erecting shop and roundhouse, both before and after the work is performed upon the locomotive?

What system of inspection do your axles, crank pins, piston rods, side and main rods, which are to be re-applied, pass through?

Do you have a limit of service governing the re-application of these parts, as well as a limit of wear?

How do you arrive at the cost of locomotive repairs so as to know from day to day and week to week how much money is being expended on engines in the erecting shop?

F. C. Pickard:—We want to know what records the shop has for arriving at the cost of various operations and repairs, and of knowing from time to time what expenditures have been made upon locomotives.

L. O. North:—The general rule is to get the cost of repairs after the locomotive has been turned out. Then if the cost runs higher than it should for the amount of repairs, everybody gets combed with a fine tooth comb to see why it cost more than another engine. I believe some system should be devised whereby you would know every day the exact amount of labor and material expended on each engine.

J. W. Finch (C. R. I. & P.):—We have a clerk that checks the service cards over each day. Engines in the shop are each given a shop number. The machinist that works on the engine charges his time to the shop order number, and the clerk takes the time and compiles it. In that way we know just what each engine costs us from day to day. This piecework proposition I do not know much about, but I find that I am able to give the master mechanic an answer to any question that he asks me in regard to the cost of an engine. It gives us a chance to know where we are spending our money. If we are spending more money in the machine shop and are a little short in the boiler shop, we can increase the boiler shop and vice versa. We have our foremen's meetings once a week and talk the situation over. Every morning at 8 o'clock the foreman knows just what he has spent the day before.

Have you had any experience in the use of job numbers? If so, have the results obtained been satisfactory?

F. C. Pickard:—This question was suggested through the minutes of a railway club. A certain general foreman inaugurated such a system. It seemed to be a compromise between piece-work, time and bonus, and was a matter of getting a check on the individual of the time consumed in doing a job. Every operation on the locomotive was enumerated. When the man did the work he placed upon his daily time slip the time he took. They had an elaborate system of checking these slips and in that way made comparisons. While they worked on a day rate it gave a very good check on the cost per piece or operation. It has been stated that the unions object to piece work. Probably this proposition would appeal to them.

L. H. Bryan:—In our shops everything that comes in for any kind of repairs is done on a shop order. There is no complication at all in regard to men charging their time to the wrong shop order, as we assign two machinists and their helpers or apprentices to an engine. They do all the work, and if they happen to be changed are very careful, as they know we have a system showing the cost of each engine. The foreman of the machine shop checks the slips over each day as they are turned in. If there are any mistakes he corrects them before the time keeper gets them. We started doing that several months ago. It is working out to better advantage than when we charged work to the engine number. We also charge tank work or anything like that to a shop order number, because our tanks may get changed about from one engine to another. It would hardly be fair to charge the work on a tender to the engine that it was on, if it was only out for one trip.

F. C. Pickard:—I believe we could have a system, such as we have on the locomotive individual performance sheet, by which the mechanics or operators of the shop may be checked. Each individual operation that is performed upon an engine in classified repairs would have its respective number, and the work when accomplished by the workman could be charged to that number. A comparison could then be made as to the time it took different men to hang a set of guides. This performance sheet could be posted in the shop or be put in the hands of the foreman who has charge of the work, so that he would know just what each individual was accomplishing. The system appealed to me because of the opposition to the bonus and piecework systems.

J. A. Boyden:—We have our piecework checkers. They have a schedule, giving the number of every operation. It does not make any difference to us whether a man is ten hours or two hours in hanging a set of guides, but we do keep a record of the actual time every man expends on a particular job.

F. C. Pickard:—I would like to know how many of our members represent piecework shops. Will they please stand up? (Three members stood up.)

What system have you of acquiring advance information as to the repairs necessary to engines to be shopped at a future date?

W. W. Scott:—From time to time while an engine is in service a record is taken of its condition. We have in the general foreman's office a card index system showing the condition of all locomotives; if anything has occurred to an engine in the way of necessary repairs that can be put off until the next shopping, it is noted on the index card. If at any time it becomes necessary for the engine to go over the drop pit for work, the card is examined by the general foreman and the work is done, if it can be, without shopping the engine for classified repairs. We find the system very effective because we know in advance the nature of the repairs to be made, and if there is any material necessary we have it ready. If we have an engine with a defective driving box, but not broken so badly that it cannot be kept in service for a month or two, it is reported on the card. The cost of repairs is reduced because we do not have to wait until an engine is on the pit to see what material is necessary for repairs.

HANDLING OF MATERIAL.

Have you a system of advising the store department of material required for engines to be shopped, 30, 60 or 90 days in advance?

In what manner do you handle the manufacture of new material?

Have you a system of shop orders? If so, how do you handle them?

In the handling of material, by whom are the orders issued to the store department? If done by the foreman, how does he credit the scrap removed?

What is your idea as to the best method of handling this?

Is the ordering of material done by the mechanical or store department upon weekly or monthly requisitions; what is your recommendation for handling material in the most expeditious way from the store house to the shop? From where placed in shop to machines? From machines to erecting floor?

Lack of time prevented a discussion of these topics in detail, although some of them were commented on in connection with other parts of the report, with which they are closely allied.

SHOP METHODS.

Have you a method of shopping engines on your road and as general foreman are you notified in advance of their shopping? Would this information be beneficial? If so, in what way?

Do you specialize your work throughout the shop both on the erecting and machine sides?

Do you deem it advisable to manufacture parts of a locomotive before you intend shopping the locomotive?

Have you a system of delivering material to the engine or machine? If so, what is this system and how handled?

Do you advocate the location of a sub-store room in the center of the shops?

Is it advisable to permit high priced men to go to the store room to get material?

How do you handle the manufacture of material for outlying points? Charging of material, scrap credit, etc.?

In allotting various operations in repairing locomotives, what class of labor do you use in handling them? The wheeling of locomotives, by whom supervised? Application of ash pan, front end, draft appliances, shaker rigging, etc.?

What sort of schedule have you for shopping engines? That is, when an engine is taken into the shop, do you arrange a systematic schedule based on some previous performance of the date when the engine should be and must be out?

How do you manage the up-keep of machine tools so that efficiency is not imperiled by their wear and abuse?

How do you handle tools issued to mechanics and others for use during the time they are employed? Are these tools charged to the employee and signed for by him? If so, should any be purloined what action is taken? Would you deduct the value of the tool from the wages of the mechanic?

What system of checking tools at the tool room do you have in vogue in your shop? Are these returned at the end of each day's work?

Do you have a system whereby the tools are delivered to the mechanics on the job, not permitting these men to go to the tool room?

What method of selection and maintenance of suitable tools have you inaugurated? Outline your procedure.

In the promoting of shop efficiency what is the relation of standards to the cost of production?

For inaccessible parts that are to be repaired on a locomotive have you a system whereby they may be recorded and remedied at the next shopping? Poorly located minor parts, and particularly the careless running of piping, which in some cases must have several tight joints broken to permit the simple tightening of nuts behind it, are innumerable.

Or though a dome casing never needs any repairs in the lifetime of the engine, the dome cap which it covers

sometimes has a leaky joint and frequently has to come off. Difficulty is then experienced in getting at it as the casing is made up in two pieces; the lower section, a cylinder of heavy planished iron surmounted by a heavy rounded top. The top mentioned has no provision made for taking hold of it with tackle and is hard to handle. Springs are often so located that it is necessary to drop the wheels to change them.

For inaccessible locomotive parts and details, can there not be a system of records arranged with a view of bettering the conditions?

What system have you for keeping account of repairs on locomotives? What record is kept so that duplicate parts may be shipped to outside points for repairs?

H. D. Kelley:—A few manufacturing shops have despatchers to despatch the work. There is a possibility of conflict between the machine foreman and the erecting foreman, when the work is delayed. I believe we should have certain men to follow the work around—to despatch the work through the machine shop and to the erecting shop. In that way you are absolutely in touch with the work and know at once where the delay is. Considerable friction can be avoided. It is followed out very successfully in one of the large manufacturing shops of this country. The despatchers have absolute charge of the work. When it is completed on one machine, it is taken to another and the time is noted. It is the same with the next operation, and so on from the time the work is started until it is finished.

W. W. Scott:—We have started a system of cards for locomotives in the back shop, noting the repairs necessary. The gang foreman, or somebody designated by him to do the work, goes over the engine; if it is necessary to renew a driving box, crank pins or other parts, it is marked down. The card is kept in duplicate. The machine foreman in the morning, or at any time during the day that he sees fit, can refer to his card without running around to find out how the men are getting along with a certain set of repairs. He will find that the eccentric straps were finished at a certain time. This method is a little crude, but it opens a wide range of effectiveness. We all know that each foreman thinks that his department is getting a little the worst of it. The machine foreman will complain that if the gang foreman had delivered the work to him he would have had the engine out without delay. The gang foreman will say that he had the job over there three days before the machine foreman touched it. The general foreman can cover this. He can now tell the exact hour at which it can be finished.

Have you a method of shopping engines on your road and as general foreman are you notified in advance of their shopping? Would this information be beneficial? If so, in what way?

William Hall (C. & N. W.):—I have always been a strong advocate of advance information, not only regarding going into the shop for repairs, but as far as possible for running repairs also. It is apparent that if this advance information can and is given, engines can be gotten into service much sooner than if the information has to be gathered after the engine is shipped. The practice in vogue at the principal shops of the Chicago & Northwestern is as follows: Engines are put on what is termed the hospital track. Here they are checked up daily as to the number and class of engines and the nature of repairs required. The nature of the repairs is gathered from what is called an X and O sheet, which should be sent in with each engine. These X and O sheets are gone over carefully by the shop superintendent, who selects such engines from the hospital track as will keep all departments busy, and not crowd one department to the detriment of another. For instance, he is careful not to have in too many engines needing heavy boiler repairs at one time, nor too many engines with broken frames, etc. but distributes the work as evenly as circumstances will permit; by this means we get out an average number of engines each day.

The storekeeper and the heads of the various departments are

advised that certain engines, giving their number and class and nature of repairs required, are coming to the shop. The material is looked up and conveyed to the various departments. The boiler shop foreman takes his measurements, and makes the necessary preparations, such as flanging flue sheets, punching and shearing side sheets. Other departments can be getting their material worked up into shape and make all preparations as per the advance information. When the engine is shopped the work is pushed through to completion with the least possible delay. If an engine requires new cylinders, the cylinders are on hand before it is shopped, thus avoiding any delay, and the taking up of unnecessary shop room.

Do you specialize your work throughout the shop both on the erecting and machine sides?

William Hall:—I am a firm believer in specializing the work, wherever and whenever it is possible to do so. It was my privilege to inaugurate the system of specializing in vogue at our Chicago shops at the present time. When I started it I did so by degrees. I was watched very closely and criticised more or less, but the results obtained proved that I was on the right track. That was about twelve years ago; since that time the system has been extended and elaborated upon. In support of my theory, I wish to say briefly that in specializing the work, the men have the necessary tools and appliances for doing their particular work, and become so proficient at it, that the time required is reduced to a minimum and there is no lost time moving from one job to another. I fully realize that this system cannot obtain in all shops as local conditions would not warrant it, but in all large shops, or shops where work is done in large quantities it can be made to work most satisfactorily.

William G. Reyer:—(See his remarks under: What plan of organization do you find to be most effective?)

Ferdinand Bauer (C. C. C. & St. L.):—The best shop practice is to divide the work into classes and to have the men specialize. We found we could get better results by doing this. We have four gang foremen. Each one has a special line of work and carries it through from one engine to the other.

R. W. Burnett (Ill. Cen.):—I believe the standardizing of work is one of the best things tending toward good organization in the shop and the reducing of the cost. I represent a small shop, but we do as much of it as we can, especially, on the machine side.

S. E. Mueller (C. R. I. & P.):—We have not a very large shop, but I find the best efficiency is maintained by specializing all classes of work.

C. L. Dickert (Cen. of Ga.):—We have our work specialized and have carried out this plan on the machine side as well as in the erecting shop. All our mechanics are union men. We have a man who does all the lining of guides and facing of valves, another one for valve setting, squaring up engines, and laying off shoes and wedges. We use handy men on drill presses, and bolt cutters and some few in the blacksmith shop and boiler shop.

Thos. Zinkan (C. C. C. & St. L.):—If we consider a shop that works on a large number of engines at one time, specialization is the best plan for keeping every man busy and getting a full day's work from them. If we specialize the work, however, we will more or less demoralize the trades. For instance, if we specialize our men on setting flues, in the years to come we will have a class of flue setters. If we have the work specialized, our apprentices will not get the full information that they should have and we will hamper ourselves in the near future. For the smaller shops specialization is a detriment.

T. H. Ogden:—I find that keeping men on one class of work all the time is a failure under certain conditions. My shop is small. We handle about twelve engines a month, doing the running repairs. Tomorrow I might have twenty engines, and the day after sixty. How can I specialize the work and keep these men busy? Our system is to specialize wherever it is possible to do so.

E. J. Brewster (C. & N. W.):—We believe in specialization, both on the floor and the machine side. We have quite a number of apprentices and we give them a very good show. They go through just the same course as they did before the specialization took place.

W. Smith:—If you can specialize any work in either the shop or engine house, the men who are specialists will figure ahead and get wrenches and special tools made for the work; they will also have on hand a supply of the material that they are going to use. They will, for instance, have such tools as boiler check reamers. When these are kept in the tool room they are, as a rule, neglected; but when the men do nothing else but use these tools they will keep them in shape, and they can do the work with despatch. In some roundhouses they never know where they will find a tool and lots of times new men will not know that there are certain tools, but will go ahead and use something that requires twice the time. If you can specialize the work they will have the tools kept up in first class shape. With a man on one job today, and on another tomorrow, he will not go ahead and develop new ideas as readily as does the specialist.

Do you deem it advisable to manufacture parts of a locomotive before you intend shopping the locomotive?

William Hall:—I believe that every progressive man will answer the question in the affirmative, and say by all means to do so whenever it is possible and to bring the work as near the point of completion as circumstances will permit. Here is where your advance information will stand you in good stead, so that the required material may be manufactured before the engines are shopped.

Have you a system of delivering material to the engine or machine? If so, what is this system and how handled?

William Hall:—When a requisition is made the storehouse delivers the material directly to our manufacturing department by cheap labor. Here it is delivered to the machines by laborers, and after manufacture is delivered to the engines by laborers. The system is a step in the right direction: viz., efficiency in using cheap labor for this class of work, thus keeping the high priced men on a better class of work.

Do you advocate the location of a sub-store room in the center of the shops?

William Hall:—That depends largely on the size of the shops and the proximity of the shops to the main storehouse. If these sub-storerooms were adopted it would mean an increase in the stock to be carried, consequently an increase in money invested in stock, and that is what we are all guarding against. However, much time will be saved and less material will be used by the judicious use of sub-storerooms for small supplies, such as nuts, pins, bolts, washers, etc. I have tried this with great success. The carrying of a sufficient stock on hand is a great factor in the output and efficiency of any shop. I am strongly opposed to an overstocked storehouse, but I am as strongly in favor of carrying a sufficient stock for the safe and economical operation of the shop forces. There is no money saved and lots of time and money is lost by waiting for material, or by having to rob Peter to pay Paul. It is every foreman's duty to watch the stock and assist the storekeeper in keeping it to a minimum just as closely as he would watch his own financial affairs, using every pound of usable material he can find, and keeping a sharp eye on the scrap pile to see that nothing that can be used again gets away from him.

Is it advisable to permit high priced men to go to the store room to get material?

William Hall:—This must be governed by local conditions, and the help at one's command. All things being equal I should deem it a great waste of time and money to permit high priced men to leave their work and get their material from the store

house. In small shops where an insufficient amount of help is employed this cannot always be avoided, but in the larger shops, messengers should be employed for this purpose.

How do you handle the manufacture of material for outlying points? Charging of material, scrap credit, etc.?

William Hall:—Most of the material for outside shops is manufactured in Chicago where we have a distinct department for that purpose. Manufacturing is done by lot numbers. The storekeeper issues an order for so many pieces of this or that to be manufactured, at the same time issuing a lot number. To this lot number is charged all the material used and the time and labor expended in its manufacture, including cartage; when the lot number is completed, the manufactured articles are returned to the storehouse and lot numbers are signed by the various departments, stating the time commenced and the time completed, and the number of articles manufactured. The cost of manufacture is then computed, and when the articles are drawn out for use these prices are used in computing the cost of repairs. All scrap from locomotives is charged to an engine general account. Thus every locomotive gets credit for its quota of scrap.

In allotting various operations in repairing locomotives, what class of labor do you use in handling them? The wheeling of locomotives, by whom supervised? Application of ash pan, front end, draft appliances, shaker rigging, etc.?

William Hall:—In our Chicago shops, as in several other of our larger shops, the stripping of engines, removing of wheels, and wheeling of engines is done entirely by common labor, supervised by a gang foreman who is a machinist. At other points this is done by at least two machinists and as much common labor as necessity requires; these under the supervision of the foreman, as required by the machinists' schedule. The removal and application of ash pans, front ends and draft appliances is done by handy men employed in the boiler and tank shop.

What sort of schedule have you for shopping engines? That is, when an engine is taken into the shop, do you arrange a systematic schedule, based on some previous performance, of the date when the engine should be and must be out?

William Hall:—At all our large shops we have a schedule in force which is giving great satisfaction. Everything on the engine is done according to schedule—from the stripping of the engine to the last operation before it is ready to leave the shop again for service. The schedules are as follows:

Light repairs	54 hours
Heavy repairs	90 hours
General repairs	126 hours
General and half side sheets	162 hours
General and new firebox	198 hours

How do you manage the up-keep of machine tools so that efficiency is not imperiled by their wear and abuse?

William Hall:—The up-keep of machine tools, both big and little, is handled by a force of competent men employed in the tool room and under the supervision of a tool room foreman. Any irregularity tending to impair the usefulness or efficiency of tools is immediately reported to the tool room foreman, who gives it his prompt attention. All lathe, planer tools, etc., are ground by a competent operator.

How do you handle tools issued to mechanics and others for use during the time they are employed? Are these tools charged to the employee and signed for by him? If so, should any be purloined what action is taken? Would you deduct the value of the tool from the wages of the mechanic?

William Hall:—I am not aware of any set rules governing tools given to employees for use during employment, other than it is generally understood that they must return all tools assigned to them in case they leave the service, before they can

receive their time check. As a rule we have very little trouble from this source. I am not so sure that the courts would uphold one for deducting the value of a lost tool from a man's wages.

What method of selection and maintenance of suitable tools have you inaugurated? Outline your procedure.

William Hall:—The selection of tools is done by recommendation of the foreman and master mechanic to the superintendent of motive power and machinery, who allots each shop its proportion of a general appropriation for the purchase and maintenance of tools.

In the promoting of shop efficiency what is the relation of standards to the cost of production?

William G. Reyer:—The foreman who would successfully operate his shop must have a system, as system is the foundation of all well governed institutions. So it is with the equipment; it must be systematized or it will be an enormous expense. I have seen the time when all the corners and available spaces in the shops have been piled full of all sorts of odds and ends to meet the requirements of the odd locomotives and cars. If the locomotives and cars had been standardized the stock room would have taken care of the equipment in a surprisingly small space. In some cases it seems almost impossible to make changes to conform to this, but: "Where there is a will, there is a way." For instance, we have had to put eccentric shaped studs in the boiler to make them come within the radius required to fit standard boiler check flanges, we have put in offset pop extensions to make room for whistle valves, and enlarged cylinder cock holes to bush them down to suit regulation cocks.

I found that the cheapest and easiest way to make these changes was to find the greatest number of locomotives using a certain size of whatever I wanted to change and by making the rest to conform to these. It often pays to use the largest size of an article, as you can easily tap holes in boilers larger when it would be inconvenient to bush one to suit. The production of the standard parts is where most of the economy is realized. After a man has set up his machine for a certain class of work he can produce a large stock in a very short time, whereas if he had to make each job to fit in a special place he would accomplish very little at the end of the day. A part which is used as a template should be marked or drilled in such a way as to make it useless for anything except a template. All reamers, cutters, taps, etc., should not be allowed to vary from the standards in the least. Variation in cutters and reamers is responsible for many roads not being able to make their injector parts. It is just as easy to make work accurate as it is to make it inaccurate, if the machine man does not get careless. It is very important that reamers, cutters, taps, etc., be kept accurate, as they should be depended on to do their work without having to gage each piece after it is made.

One thing has given me a great amount of trouble, and that is odd-size washout plugs. We have just solved the problem by keeping four sizes of plugs on hand and when retapping is necessary seeing that the next size larger plug is used. This requires a larger stock, but will save the time of the man changing his machine and the roundhouse man standing around waiting. Since we installed a taper bolt machine and standard taper reamers one man makes five times the number of taper bolts for frames, rods, etc., as before, and I am satisfied that they are better made. We use a taper stud for boiler work and have standard taper taps and the corresponding dies. There is no delay in putting in new studs, as the man draws the tap and stud at the same time and applies it to the boiler; there is no delay in waiting to have the stud made to order.

Another saving by having a standard is in applying parts to the engines. It does not take a skilled mechanic to do it. You can send any part to an engine on a branch line, and all that is necessary is to remove the faulty or broken part and apply the new one. I have known of several cases where an engine was

badly needed and allowed to leave the shop with some part not made standard, but it cost heavily to send a man to make it right—possibly one hundred miles out on one of our branch lines. I could enumerate a number of similar examples, but this is enough to convey the idea that we must first establish the standards and equip our shops with proper facilities for doing the work, and then make the work in large quantities, to get the best results.

The age of standards in the industrial world began in earnest when our great railway systems adopted a standard gage for tracks, thus enabling us to send a car loaded in Boston to any point reached by rail on the Pacific coast, Gulf of Mexico, and now even to the Republic of Mexico. The establishment of that standard has saved in the cost of transportation beyond computation. Our progress has been so rapid that we have not been able to get the advantage of the standard locomotive or car. We are continually outgrowing the older ones, and in keeping up with the demands of traffic we must increase the capacity of the locomotive. A certain stationary engine sold for \$800,000, the cost being about \$750.00. After adopting a system of standards for everything and every process it was built at the cost of \$395.00. In order to do this it was necessary to put in tools that were suitable for standard work and which did not need so much skill to operate.

After a system of standards has been adopted there must be intelligent use made of the tools to maintain it. The establishment of standards and standard methods means 50 per cent. or more saving in the cost of production. In the preparation of this discussion I wish to acknowledge assistance from Mr. Adams, apprentice instructor, and Mr. Quinn, brass work inspector.

William Hall:—I am not prepared to give any figures on this important question, but the maintaining of standards is very good practice, as it is economical in various ways. It is much cheaper to manufacture in large quantities, parts are interchangeable, and this adds quite materially to the efficiency of the shop.

W. Smith (C. & N. W.):—Mr. Reyer has hit the nail on the head. It especially appeals to one at an outlying point where you have to depend upon the main shop for repairs, because there is always a great deal of trouble with parts coming back for repairs that are not standard. And at any outlying point the tools are limited and it is hard to get the part that is not standard up to standard.

For inaccessible parts that are to be repaired on a locomotive have you a system whereby they may be recorded and remedied at the next shopping? Poorly located minor parts, and particularly the careless running of piping, which in some cases must have several tight joints broken to permit the simple tightening of nuts behind it, are innumerable.

Or though a dome casing never needs any repairs in the life time of the engine, the dome cap which it covers sometimes has a leaky joint and frequently has to come off. Difficulty is then experienced in getting at it as the casing is made up in two pieces; the lower section, a cylinder of heavy planished iron surmounted by a heavy rounded top. The top mentioned has no provision made for taking hold of it with tackle, and is hard to handle. Springs are often so located that it is necessary to drop the wheels to change them.

For inaccessible locomotive parts and details can there not be a system of records arranged with a view of bettering the conditions.

William Hall:—We have no regular system that I am aware of covering the question of remedying inaccessible parts, etc., but if we find parts of this nature they are remedied the best that circumstances will permit. We have so little trouble of this nature that I am not prepared to say what system should be inaugurated.

A. F. Bradford (Big Four, Urbana, Ill.):—It is well known

that the efficiency of our machine shops is more than 100 per cent. greater than it was a few years ago. First, because of the design of the machines and the tools; second, the transmission of power has been changed from the belt drive to the direct motor drive. In spite of the greater shop efficiency, the most economic methods of making repairs can only be accomplished by simplifying the most complicated parts and the arrangement of others so that they can be repaired by removing the smallest number of parts. One instance of a poor arrangement was the location of the air pump, which was placed on the firebox; when the staybolts had to be examined or renewed it was necessary to remove the pump to do the work. This unnecessary work has been eliminated by changing the location to a position where it is out of the way of any running repairs and is just as suitably located for its own purpose.

The main air reservoir on another class of engines was placed between the frames directly behind the cylinders; when repairs had to be made to the air drums or pipes, it was necessary to jack up the engine and remove the trucks. This was a very expensive operation and would often delay the engine from its run. These reservoirs are being changed from their location between the frames and are being suspended from the running board brackets; here they can be worked on and repaired more conveniently. They are also more securely fastened in this position, which will reduce the amount of repairs.

One case of the inaccessibility of parts is the connecting rod of a 22 in. x. 30 in. locomotive. This rod has six small parts, not including the brass, all of which are very difficult to make because of their wedge shape and curved surfaces; this requires much machine work, and in a small shop very often falls to the work of one shaper, or one milling machine. These six parts are used for the purpose of tightening up the brass; in another class engine of the same type and size the brass is keyed up by two very much simpler parts; less work is also required to key up the brass with these parts than it is with the parts mentioned above. The man in the drawing room is not always familiar with the running repairs of engines, or he does not take time to think about the order in which he is placing the parts; he often puts one part that very seldom needs any repairs where it must be removed in order to repair another part that needs it more frequently. It is our duty as foremen to use our best efforts in remedying these difficulties.

What system have you for keeping account of repairs on locomotives? What record is kept so that duplicate parts may be shipped to outside points for repairs?

William Hall:—The system used on our road for keeping account of repairs to locomotives is that of checking up the X and O sheet which I have mentioned before—the X standing for new articles applied, and O for articles repaired. The foreman's orders for articles drawn from the storehouse are also checked up; also the time slips. The X and O sheets contain the names of all the important parts of the locomotive, and these parts are numbered. There is also ample room for remarks, covering the work done to minor parts not mentioned. When an engine, after undergoing repairs, is ready for service, the X and O sheet properly filled out is sent to the storekeeper, who then by the aid of the X and O sheet, the requisitions for material, and the labor slips, computes the cost; all papers are sent to the superintendent's office. In ordering parts for outside points, such as eccentrics and straps, driving boxes, brasses, etc., which are wanted for stock, the class of material wanted is given, such as Class A—locomotive material. If wanted for immediate use the class of engine the material is wanted for is given. In some cases a serial letter or number is also given; for instance, "driving axle No. 1 main for engine number 1402, Class R-1." In the case of piston rod and valve stem packing, we have a chart giving the number and class of each engine on the division, also giving the size of each piston rod and valve stem. When packing is required reference is made to the chart, and the packing is bored

and sent out ready for immediate application. When the piston or valve stem is turned or renewed the charts are corrected.

TOOL ROOM EFFICIENCY.

Mr. Pickard's suggestions for the discussion of shop methods contained three questions which might properly be grouped under the head of tool room efficiency. They are as follows:

What system of checking tools at the tool room do you have in your shop? Are these returned at the end of each day's work? Do you have a system whereby the tools are delivered to the mechanics on the job, not permitting these men to go to the tool room?

E. L. Fay, assistant master mechanic of the Union Pacific, Cheyenne, Wyo., sent in a paper on these questions in which he said:

No department of a modern shop engaged in either manufacturing or repair work has so much to do with the output of the plant as does the tool room. A sufficient number of the best tools, conveniently accessible to the greatest number of employees, is of sufficient importance to merit the personal attention of those whose duty it is to supervise and on whom rests the responsibility for economical repairs. This applies with particular emphasis to the locomotive repair shop, because the repair work on a locomotive covers a wide range and a great variety of tools, each variety ordinarily of several sizes. Certain tools, not used elsewhere, are used in the construction and repair of the boiler. This applies also to machinery, cylinders, ash pan, steam pipes, front end, etc.

It is essential that the tool room be so located that the various departments may have access to its tools with the least possible expenditure of time. It is possible (though I have never seen it tried) that a basket or bundle system, such as is in use in many department stores might be economically installed in the buildings of a locomotive repair shop, not within reasonable distance of the central tool room. The foreman under whose direction the tools are to be used should in all cases be consulted in their selection, as frequently we find that the tool shapes recommended by various manufacturers differ in efficiency, because of some slight difference in the shape. This would also apply to taps; a short tap will in most cases do the work of the long tap just as well. Then there is always one tool or one variety of a tool which we find to possess some point or points of superiority over all others. It should, therefore, as far as possible, be our aim to secure the best, which should always be that which will produce the quickest, most satisfactory and most economical results.

Tools should be grouped in the tool room with reference to the frequency with which they are used. The tools most frequently called for should be nearest the point of delivery. Those for which there is the least demand may be farther away. A proper grouping of the tools may also be considered, since certain jobs require several tools, and the tools in each of these groups should be together to save labor on the part of those charged with issuing them.

Tools should be issued to employees only on checks, and should be returned periodically, the larger number of them daily, all of them at the end of each week. There are many simple check systems in vogue at the present time; in fact nearly every shop has its own system. There is, however, one which especially appeals to me, because of its simplicity. It is termed the double check system and is used by some of the largest machine tool manufacturers. To illustrate: With our present system an employee presents himself at the tool window and requests a certain tool, and hands one of his checks (which he carries on a ring with him) to the tool room attendant. He receives the tool, and the check is deposited at some convenient point on the rack from whence the tool was obtained. Assume that the employee receives six tools, all taken from various tool room racks, for which he gives his checks. For some reason he leaves the service without returning them. He cannot obtain his time until the

six checks which were furnished him are returned to the tool room and his time order approved by the tool keeper. What is the result? Since these checks are in various places in the tool room it is necessary for the tool keeper to practically check the entire room before he can locate those against which the employee's checks stand, in order to know what action to take in charging their value against the employee, or at least making an effort to locate them.

With the more elaborate system each tool in the tool room rack carries a check; for instance a $\frac{1}{2}$ in. twist drill would have a check. If there were six twist drills in that particular place there would be one hook underneath with 6 checks stamped " $\frac{1}{2}$ in. twist drill." There would be another hook for the checks of the employees drawing such twist drills. Very close to the window would be a board with numbered hooks corresponding to the checking in numbers of the employees in the various shops using the tools. The operation of the system is as follows: An employee presents himself at the window for a tool for which he gives a check; the check is placed on the hook underneath the tool taken and the stamped check showing what the tool is and the tool itself are removed. The tool is given to the employee and the stamped check is placed against his check on the check board. Then if an employee leaves the service or advises the tool keeper that he has lost a check, reference to his "checking in" number on the board determines whether he has the tools out on check or whether the facts are as he states. This system eliminates the possibility of error to a very marked extent.

In places where tools are not manufactured and the tool room is under the direct charge of the tool keeper, who is not a mechanic, he must of necessity be subordinate to some department head, presumably the machine shop foreman. This being the case the machine shop foreman should be charged with the weekly inspection of the tools and the tool room conditions. His tool keeper should give him weekly at least, oftener if necessary, a list of the new tools required, or of the repairs required to old tools. This list should be checked against actual conditions and such replacements as are necessary arranged for in ample time to insure their being on hand when wanted. There is no virtue in a worn out tap, a dull reamer, or a reamer that has been reground so frequently that there is no further room for a chip in the flutes; neither is there any virtue in an improperly ground air hardening twist drill, therefore, these tools should be looked after frequently by those who exercise supervision over the tool room.

There is no excuse for the tool room being other than neat and orderly. Where I am situated we check out all wrenches, pneumatic tools and hose, sledges, chisels and punches, drawings, etc. We carry in the tool room a stock of standard boiler studs, hexagon nuts of all sizes, piston valve stem packing, tee headed slot bolts, etc.; also Armstrong tools of various kinds and sizes, hydraulic jacks for removing bolts and air hammers.

We have a complete equipment of ratchet wrenches of various sizes. These are economical and effective tools; mechanics will very seldom use an open wrench when a ratchet wrench is procurable. We carry them in sizes up to $1\frac{1}{2}$ inch. Above that we use a single and open wrench made for the application of pieces of pipe, if necessary. We find, however, that the ratchet wrench with the drop forged handle is much to be preferred to the cast steel or malleable iron handles ordinarily furnished by the manufacturer.

The personnel of the tool room force should be closely watched, as it is no place for drones. Our system is to use boys in the tool room who have made application for apprenticeship. We usually take them six months before they enter the shop as apprentices and try them out in the tool room. This is an excellent plan and works to the advantage of the boy while he is serving his time, because he knows where to find the tool that he wants when he wants it. To obtain efficiency from the tool room we must have enough tools of the right kind, well cared for, promptly

issued on demand, and in their proper place when not in use. No tool should be replaced on a tool room rack for further issuance unless in condition for satisfactory use.

W. G. Rose (C. H. & D.) in a written discussion said: A great amount of money may be saved in every shop where the tool room is operated systematically, even though you are not equipped with all modern tool room machinery. And there is hardly any reason why one could not have a tool room arranged for systematically taking care of all tools, templets, jigs, etc. There should be suitable racks for taking care of all wrenches, taps, reamers, air tools, jigs and templets. These should all be recorded in a book provided for the purpose, so that you will always have an actual inventory of just what your tool room equipment consists of.

These tools should all be numbered and assigned to a specific place; have a check system for issuing these tools to the mechanics, and have an individual record of every tool and its whereabouts. Just as soon as a man is through with a tool, either on the machine side or on the floor, it should be returned to the tool room. Allowing such tools to lay around the shop will prevent other mechanics from having the use of them. I believe that there should be a historical record kept of certain reamers, cutters, taps, dies and drills; by so doing, it will be an easy matter to arrive at the class of tool steel that is giving the best average service.

William Hall:—When a man, such as a machinist, boiler maker or any one that may be required to use the company's tools, enters the service, he is assigned a given number of tool checks. Upon his application to the tool room for a tool he must give one of these checks for each tool he takes out; upon the return of the tools in good condition he receives back his checks. If a man has not completed his job at the end of the day he is permitted to retain any tool he may be using, with the exception that at the end of the week all tools are expected to be returned to the tool room. It is good practice to allow an employee to retain a tool over night, as it saves time in the morning. He is held responsible, however, for all tools he may have out, until the man in charge of the tool room returns his tool checks to him.

As far as the delivering of tools to the men is concerned, both systems have been tried, that of delivering the tools by messenger, and that of allowing each man to get his own tools, but not having gone into the matter deeply enough am not prepared to say which is the most economical.

SHOP KINKS.

H. D. Kelley, chairman of the shop kinks committee, presented a paper on this subject. Shop kinks were also, of course, included in the items enumerated in Mr. Pickard's paper on shop efficiency. An abstract of Mr. Kelley's report follows:

When the subject of shop kinks was assigned to me I was at a loss to how to get up a paper to present before the convention. It would be no small task to get up such a paper, and we did not have the time or money to make it as complete as we wanted.

Roy V. Wright, mechanical department editor of the *Railway Age Gazette*, was in my office one day after the Cincinnati convention. I told him that I was called upon to write a paper on shop kinks for the 1911 convention, and that neither I nor the General Foremen's Association had the money to get out a good paper. I asked if the *Railway Age Gazette* would not publish a book on shop kinks for the General Foremen's Association, just as it had published the *Locomotive Dictionary* under the supervision of the Master Mechanics' Association. I knew the *Railway Age Gazette* had a number of shop kinks that it had published from month to month. The *Railway Age Gazette* consented to get out such a kink book, and I then wrote the executive committee of the International General Foremen's Association to authorize its publication, which it did.

I consider shop kinks one of, if not the most important problem a foreman has to contend with, for it is through methods of this kind that he is able to increase the output of his shop and keep down the cost of work, and that is what general foremen are for. If he does not succeed in this he is a failure. He should strive to run the most efficient shop in the country. Should a foreman fail to develop better methods in getting out his work he will soon find that he is a back number. There are about 700 kinks in the *Railway Shop Kinks* book, taken from actual shop practice from shops in different parts of the country. Most foremen can find kinks in this book that can be applied to their particular shops to good advantage.

I have in mind a certain shop, built about 40 years ago, that was getting out about 25 engines a month. A few years ago this output did not suit the motive power officials, and an increase was asked. Most, if not all of the foremen thought the limit of output had been reached, but after the introduction of a few new shop kinks and a few other improvements the output was steadily increased until 70 engines were reached, and I do not think the men worked any harder than when the shop was getting out 25 engines a month. This gives an example of what shop kinks will do.

It is surprising to go into some of the large shops in this country and see them using the same methods that were practiced 25 years ago. I was in a large eastern shop recently and saw them boring driving boxes by putting them on a boring mill and bolting them down with clamps and setting to a line from the boring bar. I was in this shop for several days; kinks and jigs were very conspicuous by their absence. The blacksmith shop, however, was one of the best equipped shops I ever saw for kinks and jigs. If the blacksmith shop could get kinks and jigs, why could not the machine shop get them?

I was in another large shop and saw two men chipping a smoke arch fit for a cylinder by hand when it should have been chipped with an air hammer or planed off. I was in two other shops recently, where, in the case of broken frames they were taken down and welded in the blacksmith shop under a steam hammer, when they could have been welded under the engine much cheaper and quicker with thermit. There are other instances, too numerous to mention, of where shops are very lame in kinks, although in every shop you will find that the general foreman thinks he is making a record on some particular job. If you can make a record on one job, why not make a record on all jobs? It would certainly be a paying investment for your company. A general foreman often advances the argument that he has not the men to put on this kind of work—claiming he is too crowded. I firmly believe if he would put a man on jigs and keep him there, the time would soon come when he would not be crowded with work. I recall the time when a shop that I was connected with could not keep ahead of the cylinder spring ring job. We were at that time paying 25 cents per ring for labor. By a few improvements in our methods of turning these rings we were able to keep ahead, besides cutting the labor down to 4 cents per ring, and the machinist made more money than he did at the former price.

I hope each member of the General Foremen's Association will get one of the *Railway Shop Kinks* books, and I wish to take this opportunity to thank the *Railway Age Gazette* and R. V. Wright for getting out the book under the supervision of this association.

DISCUSSION.

William Hall (Chicago & North Western, Escanaba, Mich.):—Great inventors, like poets, are born, not made; we cannot all be Edisons, but very happily it does not require a great inventor for most of our shop kinks. Nor is it always the most intricate pieces of mechanism, that it has taken years to develop, that are the most useful and count most for efficiency. More often the home or shop made tools, the result of a few hours thought, the tools that can be made use of every day, give us the best of all around results. These kinks, or short cuts if you please, are de-

signed for the purpose of reducing the exertions on the operator's part, and decreasing the time on certain operations. All shop kinks, however, are not applicable to all shops, for what would be practical in one shop could not be used in another, owing to local conditions.

A great many more shop kinks would be designed and used were it not for the prejudice of some men in authority, and this same prejudice has killed the ambition and aspiration of many a good man. Probably I should have used the word selfishness; the terms, however, are synonymous. A man may be intensely earnest in endeavoring to produce something very practical and very efficient, but if his efforts are not appreciated, and he receives no encouragement, they count for nothing. The practice of devising shop kinks and methods should be fostered and encouraged to its fullest extent, for it will be to the best interest of all concerned.

I believe in giving every man his honest due. If a kink has been developed from a suggestion of some workman, however humble a sphere he may be filling, let him get the credit for it, for possibly if he had the facilities at his command, he could have brought out the kink himself. I believe that the *Railway Age Gazette* would have had more kinks to publish but for the fact that all of us are not draftsmen, and are unable to procure tracings or photographs to send to the editor of the Shop Section of that most valuable magazine. Too much cannot be said in praise for the *Railway Age Gazette* for the deep interest displayed, and the publication of these shop kinks. I am sure there is no foreman but who can derive more or less benefit from the study of its shop kink section. That great service is rendered by these various and numerous kinks is without question; there is a great saving of energy on the part of the operator, reserving his forces for further operations, and the efficiency of the shop is increased according to the merit of the kink.

I have said that it is often the simple little kink that counts greatest for efficiency, and as an illustration will cite a small tool which I designed for testing crank pins. Sometimes we find the pins do not coincide with the main or wheel centers, indicating that one or more pins are either sprung or were not quartered correctly. In order to find which pins are out, the wheels must be removed and placed in the quartering machine, requiring the services of from four to six men. The simple kink mentioned eliminates this difficulty. Pins can be tested without removing the wheels, and it is so simple that it can be operated by any intelligent apprentice boy.

I recall a case, where, when it was necessary to finish a set of shoes and wedges from the rough, the planer hand would finish each shoe and wedge separately in a chuck. By the introduction of a simple angle iron five shoes or five wedges were finished in one operation, the number being limited to the length of the planer bed. This was on a single headed planer. I could cite numerous cases just as simple, and as equally efficient, such as using arbors for planing crossheads instead of removing the piston; the introduction of frame spreaders made from piping, instead of using heavy jacks, thus not only increasing the efficiency of the men and the shop, but eliminating the element of danger of the heavy jack falling and hurting someone. The gain in efficiency of a shop using these various kinks is difficult to estimate, the gain depending upon the kinks themselves and local conditions, varying from 10 per cent. to 500 per cent., as in the case quoted above.

W. G. Rose, master mechanic, Cincinnati, Hamilton & Dayton, Cincinnati, Ohio, presented a written discussion on this subject from which the following is taken: Any shop in which machinery or parts are manufactured, and which is in competition with other shops, depends largely on kinks and jigs to increase its output at a decreased cost. The first thought is to provide a modern up-to-date tool room with a man of an inventive mind in charge, and with sufficient help so that when he plans a useful shop kink he can pass it over to a mechanic and have it made, placed in service and followed to see that the operator thoroughly

understands how to use it. In a great many shops where a good labor saving device is installed, certain mechanics will hang back and not show the proper spirit towards using the tool. It is necessary at times to get the men together and insist on certain tools being used. After they have once fallen into line and realize its advantages they can hardly be persuaded to get along without it.

In most manufacturing establishments a jig or kink is devised for almost every operation, and a limit of cost is seldom placed on the cost of a tool which can be shown to be a paying proposition in facilitating the work and decreasing the cost. If it were not for competition, in all probability they would not be so active in this respect; they would simply build a machine and set a price on it. As a general rule most railway shops set aside a very small portion of their appropriation for the tool room. They are generally limited for space, tool room machinery, and men to operate it. As a rule the tool room men are kept busy repairing broken tools, broken down machinery, and doing other outside work.

We manufacture all kinds of parts and material for locomotives and cars and are doing it with practically no competition. If the railways were selling these parts in competition with each other tool room facilities would quickly improve and more attention would be paid to up-to-date machine tools.

I was shop demonstrator for about four years on a road which took a great interest in installing devices which employees would suggest, providing they could be shown to be a paying proposition. During that time one of my duties was to visit all the important shops throughout the country and exchange ideas with other people. Some might imagine that it was copying other men's tools and ideas. There are some foremen that think they must not adopt anything that is not original with them. This is wrong. A man, to make a success, must not hesitate to copy anything that is legitimate; as a general rule he will try to add improvements to the other men's ideas, which will not only be beneficial to him, but to the next man that calls at his shop seeking ideas.

It was surprising to find some large shops that were operating as they did years ago, without the least effort to develop any devices to help reduce the labor cost. To illustrate, I visited a shop which had seven pits and some very good machinery; the general lay-out was good. The first thing that attracted my attention in passing through the boiler shop was two men welding flues by hand. They also had a night gang on this work in order to keep up with it. I asked if they did not think it was a slow and expensive process. They said it might be slow, but they were doing good work. I asked how much it cost to remove, prepare and re-set a flue. They replied that they did not know. I merely cite this as an example of how some shops will go along day after day, not knowing what their neighbors are doing. One of the most important things that can be done in railway shops today is to have the general foreman and all his subordinates take their turn in visiting different shops about the country, and exchanging ideas with their neighbors; in so doing there will be hardly a man but will pay for his expenses, if not for his monthly salary on every trip.

The master mechanic came to me before I became a shop demonstrator and said: "I am going to send you to look over a large shop in Nebraska. If you can bring back any ideas and show me that the company has been paid for your trip, I may send you out again." I can assure you that I was not in the shop one hour before I had made enough notes of improved methods of doing work to pay my salary for several months. After that, for four years, it was one of my duties to travel through the country getting ideas and putting them into effect in our shop.

I do not want to be misunderstood as to the condition in a good many of our shops or to intimate that the foremen are not first-class men, for I believe that most of them are. But the general rush in most of the railway shops prevents them from

figuring out and developing many good ideas and kinks which they could if they were not so badly handicapped. The master mechanic, general foreman, and machine shop foreman generally have entirely too much to look after to devote the necessary amount of time to tools and shop kinks.

That is why I believe there should be some live mechanic on every road with an inventive brain to follow up this line of work, and with a liberal appropriation for the tool room to work out standards and develop standard tools for doing the work; also to make templets for every class of work possible. The laying off of new material at drill presses or other machines would then not be necessary. Each part should be interchangeable. There should be standard reamers for cross-heads, wrist pins, knuckle pins, etc. Whenever a good tool is gotten up for one shop, and it has been demonstrated that it is a good tool, it should be made a standard tool. If the road is only able to support one large first-class tool room, the tools should be manufactured at that one point and be sent to the different places along the line. You will often find a good tool installed in an engine house near a large shop, but the fellow that has the little roundhouse away from the main shop has not got the tool because he cannot make it; he is really the fellow that ought to have all the labor-saving devices. They should be manufactured in the main shops and forwarded to all small shops and roundhouses on the system.

This will also apply to the manufacturing of standard appliances such as cab fittings, including injector throttles, blower throttles, air pump throttles, etc. This material can be manufactured in large quantities by having a full set of tools and jigs for doing the work, and it can be done much cheaper and be forwarded to other points on the road. This of course should be done at one of the shops that maintains a brass foundry.

F. C. Pickard:—Every foreman is aware of the economy which shop kinks produce. You might just as well start to eat your dinner without a knife and fork as to try to accomplish results in a machine shop without shop kinks. You might just as well try to saw wood with a hammer. You have got to have shop kinks.

W. G. Reyer:—Every general foreman will find it to his interest if he can take a trip and see what the other shops are doing and make a note of what he sees. As to shop kinks, I have not many original ideas, but in the shop I have charge of I put a young man in charge of this special work. We call him the shop demonstrator. Besides having charge of the apprentices we look to him to get out tools for the different work. I explain what we would like to have and outline the work, and he and the draftsman work the jig out. I get a good many ideas from the drummers who see what is going on in other shops.

L. O. North:—The idea of having the general foremen and shop foremen visit with the other fellow and see what he is doing is good. I could cite several instances where we followed out that plan right here in Chicago. Take as an illustration a device which we saw in the North Western shop. It was for chucking and machining rod brasses on a shaper. Formerly a shaper and small slotter were used to take care of this work. By adopting the improved chuck, the shaper was able to take care of the entire amount of this work and also do other work, thereby releasing the slotter for other purposes.

W. Smith:—A few years ago when working as a machinist I made it a practice to work in different shops, not because I was dissatisfied with any one of them, but because I wanted to see what was done in other shops, and pick out those features which I thought would be best to put in practice if I got to be a foreman. It was a very good experience. I remember many a time when I have worn out my hands trying to ream holes with dull reamers. What impressed me more than anything else was the lack of tool equipment. I remember in one shop which repaired thirty engines a month there was only one hack saw

to serve about four hundred machinists. It is a very cheap affair. A hack saw frame costs about fifty cents. The tool foreman did not seem to be far sighted enough to see the lack of small tools of that sort. In almost every shop there was a lack of pipe wrenches. All of these things are comparatively cheap.

What impresses me more than anything else is that the workmen should have individual tools and the gangs should have their own tools. I am in favor of the portable tool box and portable racks for boiler washing. I think more time is saved in that way than anything else. In roundhouses all machinists should have portable tool boxes for carrying hammers, wedges, etc., that they are sure to use during the day. Of course where there are twenty or thirty machinists employed in a roundhouse it is a big expense. It takes a great many tools, but it is money well spent and pays for itself in a very short time.

Another thing that impressed me was a portable lathe. It can be set alongside the engine. I know of some shops where the machine shop is located five hundred feet from the erecting shop, and the boys have to run back and forth. When these portable tools are used it saves two or three hours a day. In the roundhouse there is generally a lack of proper reamers for gage cocks and that sort of thing. These are really shop kinks, because they are labor-saving. One shop that I worked in did not have anything at all in the way of proper reamers. When anything was needed the machinist would go to the foreman and get an order for a new one. I suppose a great deal of this material was afterwards reclaimed from the scrap pile at the main shop. Another thing that impressed me in some shops was the method of carrying shoe and wedge liners already cut, and liners for taking up slack between engine and tender. It saves time and promotes efficiency.

C. L. Dickert:—Unless a foreman visits other shops and sees what is going on, he soon becomes a back number. I visited a shop not very long ago where I got next to a kink that increased the output of one article from twenty in nine hours to two hundred and seventy in the same length of time. It was a die for making fire rakes. We had an order to build three hundred new box cars and we had to make the yokes. We made dies for upsetting and punching three holes in each end in one operation. The stock was $1\frac{1}{4}$ in. x 5 in. A man could upset and punch thirty ends an hour. In the machine shop we have a shoe and wedge combination tool and have planed them at a cost as low as four cents apiece; the average is seven cents.

Member:—It is almost impossible for some of the foremen to get off long enough to attend this convention or to visit other shops, but they can all have the benefit of the mechanical journals.

F. C. Pickard:—I would like an expression from the general foremen as a body as to the way in which to handle shop kinks. Do you have a man who is assigned to this work as an assistant or aid to the general foreman or tool foreman? Do the general foremen as a body advocate the sending of the foremen of the various departments to other railways to get ideas of shop kinks?

U. T. Gale:—I presume that it is the opinion now, if not before, that it is necessary that the general foreman should be a live one. He should be alert all the time. He should be ready to receive suggestions, no matter how humble a person they may come from. He should be broad minded and fair and should take advantage of every opportunity to increase the efficiency of his department. I believe that we take it for granted that it is absolutely necessary in order to get out of the fossil condition that men should communicate and get in touch with their fellowmen. I believe that it is taken for granted that we do not individually possess all the good ideas. I have known of poor ignorant laborers expressing ideas, which possibly they did not know the value of, in the way of creating some efficient method. We ought to have some system whereby the individual employee should be given an opportunity to express an idea.

I believe there ought to be some method whereby we could gather up those ideas and give the men due credit.

T. E. Griffin:—There is a firm in Indianapolis which has adopted a system of that kind. They allow each man, laborer or machinist, to write a paper on some improvement. Every three months these are sent to the office and a committee is appointed. If they do not amount to anything, they thank them just the same. If they do, they give them a premium, small, but enough to encourage them.

H. D. Kelley:—You frequently get up a shop kink and later find that it is not a new idea but has been used in some shop for years. This useless expenditure of energy may be eliminated to some extent by visiting shops or by taking the mechanical papers.

OTHER BUSINESS.

Election of Officers:—F. C. Pickard, master mechanic, Cincinnati, Hamilton & Dayton, Indianapolis, Indiana, was elected president; J. A. Boyden, of the Hornell shops of the Erie, was elected first vice-president; T. F. Griffin, of the C. C. C. & St. L. at Indianapolis, was elected second vice-president; W. Smith, of the Chicago & North Western at Fremont, Neb., was elected third vice-president; L. A. North, of the Illinois Central at Chicago, was elected fourth vice-president, and L. H. Bryan, Duluth & Iron Range at Two Harbors, Mich., was elected secretary and treasurer. The three new members of the executive committee are W. W. Scott, Cincinnati, Hamilton & Dayton, Indianapolis, Ind.; W. C. Reyer, Nashville, Chattanooga & St. Louis, at Nashville, Tenn., and U. T. Gale, Chicago & North Western, Chicago.

The last session of the convention, Thursday afternoon, was given over to the consideration of the future work of the association and plans for the coming year.

The exhibits occupied the rooms leading from the banquet hall in which the meetings were held, and were most attractively arranged. A list of the exhibitors and of the material and apparatus exhibited appeared on page 186 of the *Railway Age Gazette* for July 28.

SHOP KINKS.*

BY THEODORE ROWE,

General Foreman, Great Northern, Jackson Street Shops, St. Paul, Minn.

PISTON ROD ROLLER.

The roller shown in Fig. 1 provides a smooth hard rolled surface for piston rods. The old method of finishing these rods

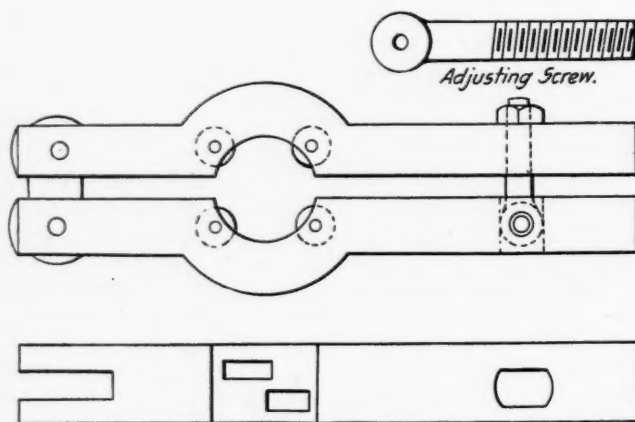


Fig. 1—Piston Rod Roller.

by filing and polishing with an emery cloth and oil is not nearly as satisfactory. Its design is clearly shown and the application

*Entered in the competition which closed January 15, 1911.

is simple. The roller is placed in position and adjusted to give the necessary pressure. The adjusting end is allowed to rest on a tool in the tool post; the lathe is started up and as the carriage is fed along the bed the roller follows.

MOLD FOR PISTON ROD PACKING.

An ingenious device for molding piston rod packing is shown in Fig. 2. It consists of two shells, as shown, which are placed on the piston rod and clamped together; the metal is poured through a hole in the top. Molds are made for the different size piston rods. This arrangement has a decided advantage over the

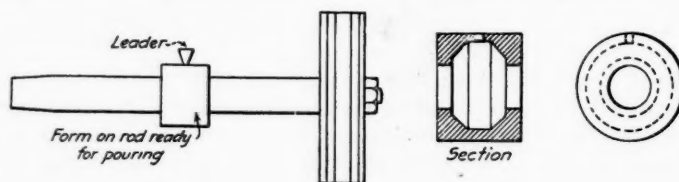


Fig. 2—Mold for Piston Rod Packing.

old method of making rod packing in that as soon as the metal has cooled, the dies have been removed and the pouring neck has been cut off, it is ready for use. A perfect fit is always assured and a solid packing is obtained which gives much better service on a locomotive.

EJECTOR FOR DRAINING WATER FROM DROP PIT.

A home-made ejector for removing water from a wheel drop pit is shown in Fig. 3. It is simple in construction and may be made in any pipe shop. A 1-in. steam line, provided with a valve

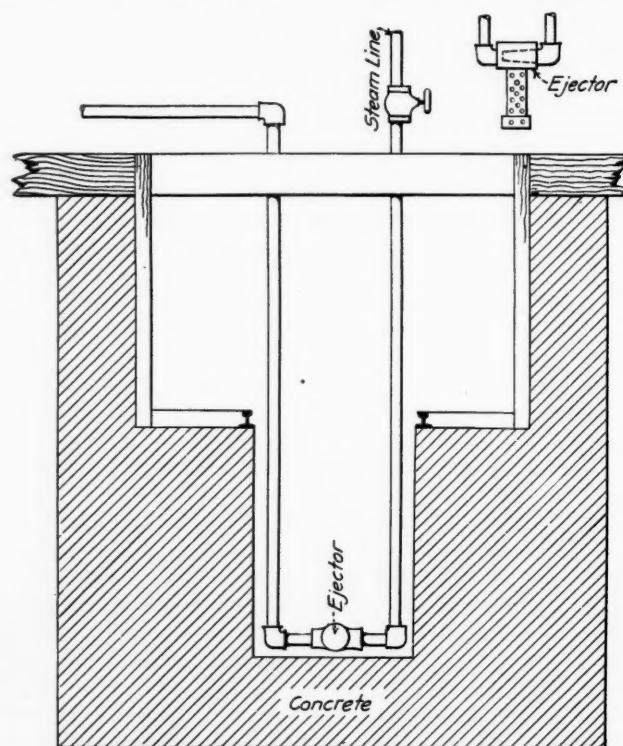
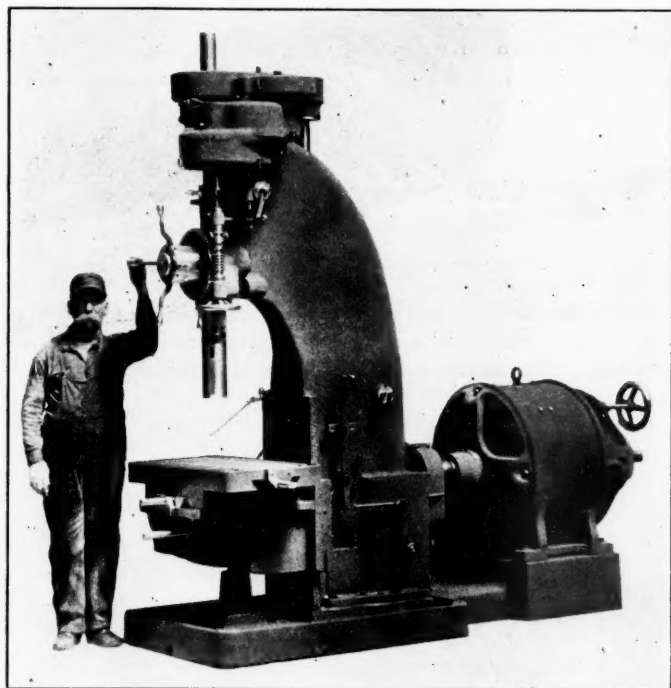


Fig. 3—Ejector for Draining Water from Wheel Drop Pit.

in a convenient location, is run to the bottom of the pit and there connected to a 2-in. tee, which is reduced for a 1-in. pipe at both ends. A steam nozzle is placed inside the tee, blowing directly across it, and a perforated pipe is screwed in the middle opening. The other end of the tee is connected to the sewer. To operate, simply turn on the steam which when passing from the nozzle draws the water in through the perforated pipe, thus emptying the pit. The pipe is perforated so as to keep any waste or chips from stopping up the pipes.

HIGH-SPEED DRILL TESTS.

The drill tests made at the Atlantic City convention with drills furnished by the Cleveland Twist Drill Company, Cleveland, Ohio, on a 25½-in. high duty drill made by the Foote-Burt Company, also of Cleveland, presented some new high speed records. The tools were taken from stock, their diameters varying from 1¼ in. to 3¼. The highest rate of speed was made by a 1¼ in. Paragon flat twist high speed drill, which successfully removed



Foote-Burt 25½-in. High Duty Drill.

70.55 cu. in. of cast iron in one minute, repeatedly cutting through a heavy billet at the rate of 57½ in. per minute, or nearly an inch per second. This drill ran at 575 r. p. m., with .100 in. feed per revolution, and successfully withstood the strain of the speed and the feed. Another noteworthy test was made with a 2½-in. milled drill taken from stock. It drilled 68 holes through a billet of machinery steel, 4¼ in. thick, without being reground. This drill was operated at 150 r. p. m., with a feed of .015 in. per revolution, removing a total of 1,418 cu. in. of material. This test demonstrated what can be done, and is indicative of what results should be expected in economical high speed drilling. The following is a record of the tests:

Size and Kind of Drill.		Material.		R. P. M.	Feed Per Rev.	Inches Drilled Per Minute.	Peripheral Speed in Feet Per Minute.	Cu. Ins. Metal Removed Per Minute.	
1¼	in.	Paragon C.	Iron	3½ in..	500	.050	25	163.6	30.68
1¼	in.	Paragon C.	Iron	3½ in..	325	.100	32½	106	39.88
1¼	in.	Paragon C.	Iron	3½ in..	475	.100	47½	155	58.29
*1¼	in.	Paragon C.	Iron	3½ in..	575	.100	*57½	188	70.56
1½	in.	Paragon C.	Iron	3½ in..	300	.030	9	117	15.90
1½	in.	Paragon C.	Iron	3½ in..	325	.100	32½	127.6	57.43
1½	in.	Paragon C.	Iron	3½ in..	335	.100	33½	131.5	59.19
1½	in.	Paragon C.	Iron	3½ in..	355	.100	35½	139.4	62.73
1¾	in.	Paragon C.	Iron	3½ in..	235	.100	23½	107.6	56.52
1¾	in.	Paragon C.	Iron	3½ in..	350	.100	35	160	84.19
2 5/16	in.	Paragon C.	Iron	3½ in..	190	.050	9½	115	39.90
3	in.	Paragon C.	Iron	3½ in..	120	.100	12	94	84.82
1¼	in.	Paragon Mch.	S.	4¼ in..	350	.030	10½	113.7	12.88
1¾	in.	Paragon Mch.	S.	4¼ in..	225	.040	9	94.8	18.66
2 5/16	in.	Paragon Mch.	S.	4¼ in..	165	.020	3¼	100	13.65
2 5/16	in.	Paragon Mch.	S.	4¼ in..	200	.020	4	121	16.80
2½	in.	Milled Mch.	S.	4¼ in..	150	.015	2¼	98	11.04
2½	in.	Milled Mch.	S.	4¼ in..	150	.040	6	98	29.45
2½	in.	Milled Mch.	S.	4¼ in..	175	.040	7	114.5	34.36
1¾	in.	Paragon Mch.	S.	4¼ in..	275	.030	8½	125	19.84
3	in.	Paragon Mch.	S.	4¼ in..	150	.030	4½	117.8	31.81
3¼	in.	Paragon Mch.	S.	4¼ in..	150	.030	4½	127	37.33

* This is the highest drilling speed on record.

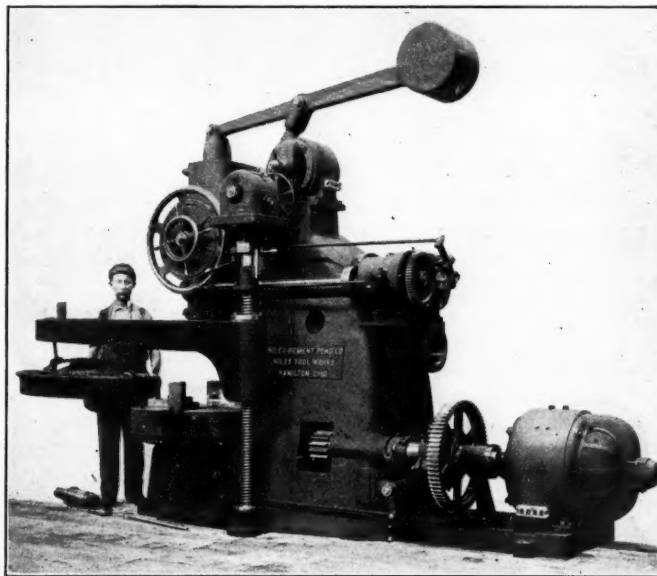
The machine was of the makers' standard type being a regular stock machine. It was driven by a 20 h. p. variable speed direct connected motor of from 300 to 1,200 r. p. m. It has nine changes of geared feed, any one of which is instantly available without the necessity of stopping the machine. The feed is operated by levers located at the front of the machine within easy reach of the operator at all times. The power feed is provided with an adjustable automatic stop, as well as a hand stop. The hand feed is operated through a worm and wheel, and a quick movement of the spindle in either direction is accomplished through a spider hand wheel located at the front of the machine, which, with either the in or the out movement of any or all of the handles, engages or disengages it.

The table is of the bracket knee type, having a large square lock bearing surface on the upright, to which it is securely gibbed. It is further supported and elevated by a square thread telescopic jack screw, located underneath, slightly back of the spindle, so as to permit boring bars and other tools passing through the table. It is also provided with liberal oil grooves and two T slots for clamping the work to the table. The spindle is made of forged high carbon steel, and is fitted with a ball bearing thrust of special make, which is guaranteed not to crush under the most severe duty. All the bearings are bronze bushed, except the main driving shafts at the base and top of the machine, which are equipped with Hyatt high duty roller bearings.

CAR WHEEL BORING MACHINE.

The accompanying illustrations show an extra heavy 48-in. boring mill for car wheels, made by the Niles-Bement-Pond Company, New York. It is of new design and is built to perform the heaviest kind of work in boring and facing both cast iron and steel wheels. The machine, though strong and powerful is, at the same time, adapted to handle work with great facility. It will chuck wheels 42 in. in diameter down to 26 in., and will bore holes from 4¾ in. to 9-in. diameter.

The table, which is 48 in. in diameter, is driven by bevel gear and has an annular bearing near its circumference. The main shaft, driving the table, is supported on its outer end by



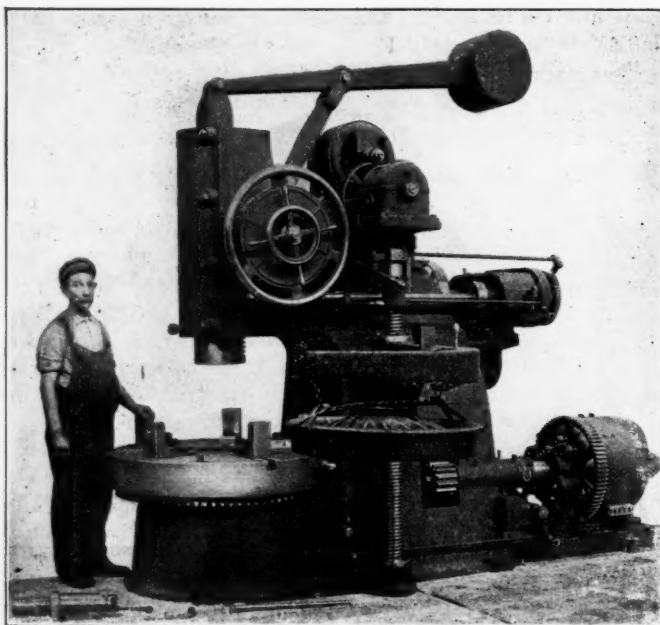
48-in. Boring Mill for Car Wheels.

a bearing integral with the machine. The bevel gears are kept in proper mesh by a filler plate attached to the table which bears on the track in the bed. The table spindle is provided with an adjustable taper split bushing, so that the wear in the spindle may be taken up at any time without throwing it out of alinement with the boring bar. To take up the upward

thrust of the table, should it tend to lift, an adjustable collar is attached to the bottom of the table spindle which bears against the bed. The table is provided with a five-jaw, self-centering, universal chuck, operated by a single motion of a cam lever. The chuck slides have a small movement used for gripping only. They are corrugated and slotted on top to fit the corresponding corrugations on the jaws, which may be set at any point on the slides.

The boring bar, which is 10 in. in diameter, and has a travel of 32 in., is furnished with six boring feeds ranging from 1/12 in. to 9/16 in. per revolution of the table. The hub facing bar is 9 in. diameter, and is furnished with the same number and amount of feeds as is furnished with the main cutter bar. Suitable speeds for boring both cast-iron and steel wheels are provided. They range from about 12 to 36 r. p. m., but the machine can be arranged for any other speeds, within reason, that may be selected within the total range of 1 to 3.

At a speed of 40 ft. per minute, the machine will take a cut of 3/8 in. on the radius with 1/8 in. feed. At a higher velocity the machine will take a smaller cut and at a cor-



Motor Driven Car Wheel Boring Mill.

respondingly lower velocity will carry a heavier cut. In other words, the machine will take a cut within the limit of the endurance of the cutting tools. The travel of the boring bar is suitable for 8-in. hub lengths, so that the cutters pass entirely through the work.

The table track is oiled by a pipe leading from the outside of the table. Attached to it is a stand pipe which insures flooding the track with a steady flow of oil. The table spindle is oiled by another pipe from the outside of the table, also provided with a stand-pipe. A power crane for handling the wheels on and off the table is regularly provided and included with the machine. When belt driven the machine is equipped with a three-step cone pulley for a 6-in. belt. A two-speed countershaft is provided, with the equipment which gives six speeds. When motor driven, a 20 h. p. variable speed motor is provided for the main drive and a 2 h. p. constant speed motor for operating the crane.

The Swiss government has recently granted a concession for the construction of a narrow-gage electric railway, about 119 miles long, from Meiringen to Engelberg, over the Joch pass. The new line is to be built by the same company that constructed the electric railway from Stansstad to Engelberg.

HIGH-SPEED UNIVERSAL CHUCK.

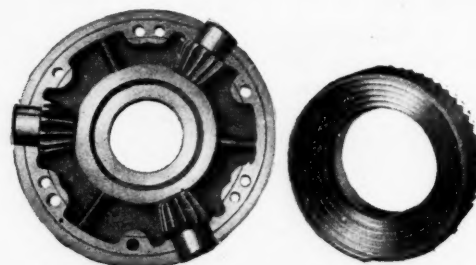
A new self-centering chuck, called the Columbia high-speed universal chuck, has recently been placed on the market by Schuchardt & Schutte, New York, to meet the demands of heavy work with high speed steel. The spiral thread for moving the



Columbia High-Speed Universal Chuck.

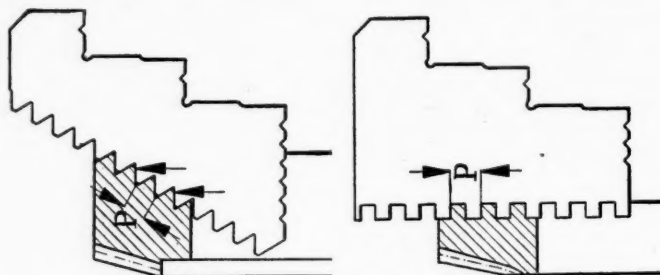
jaws of the chuck in and out, is V-shaped and is cut on the inside sloping surface of a steel ring. This ring is hardened and ground, which increases its accuracy and holds the chuck true for a longer time.

The pitch of the thread, as shown in the illustrations, is finer



Interior of Columbia Chuck.

than that of the ordinary scroll chuck, which increases its gripping power and the area of the wearing surface. The sloping surface of the body gives greater support to the jaws and insures rigidity. The jaws are made as short as possible, so that



Pitch of the Conical Spiral Compared with the Flat Spiral.

they will, in most cases, be covered by the chuck body and not protrude, so as to be caught in the hands or clothing of the operator. Owing to the ground surfaces of the spiral steel ring the friction on the ways is considerably reduced.

The Chilean government engineers have completed the surveys and estimates on nine short lines as feeders for the trunk line known as the Longitudinal, amounting to 252 miles, and are now surveying seven lines, covering 248 miles, that are expected to be ready for contractors by the close of 1911. When this line is completed from Arica to Puerto Montt the Chilean government will have a direct line covering 2,132 miles, of which about 1,100 miles are now in operation and 850 miles under construction, while the balance is being surveyed.

General News Section.

The Missouri Pacific has created a publicity department in charge of John W. Kearney, whose headquarters will be at St. Louis, Mo.

The government has brought suit in the United States District Court at Des Moines, Iowa, against the Iowa Central for violations of the 16-hour law.

The Norfolk & Western is conferring with city officials at Columbus, Ohio, in order to arrange for eliminating grade crossings and making other improvements on the east side of the city.

The Chesapeake & Ohio last week offered its shop men an increase of two cents an hour, and the committee representing the employees is reported as recommending that the offer be accepted. The men had asked for an increase of five cents an hour.

According to press despatches, boiler makers on the Houston & Texas Central have struck and the Texas & Pacific and St. Louis Southwestern boiler makers are about to demand different working conditions and an increase of about three cents an hour.

St. Croix Johnstone, flying in a Moissant monoplane at Garden City, L. I., on July 27, broke all American records for duration and distance of sustained flight. He remained in the air 4 hours and 2 minutes, traveling 176 miles. The world's records are 11 hours, 45 minutes and 463 miles, made in France.

Mayor Harrison of Chicago has appointed a board consisting of City Engineer John Ericson (chairman), E. C. Shanklin and James J. Reynolds to prepare tentative plans for a passenger subway. The traction fund available for building such a subway now amounts to about \$12,000,000, and is being increased at the rate of \$1,500,000 a year.

The state auditor of Kentucky has filed suit against the Louisville & Nashville to collect about \$500,000 in back taxes. It is alleged that the company's reports for the last four years have been incorrect, and that the counties and cities that the road passes through are entitled to four times the amount of the taxes collected during this period.

Fire destroyed 30 freight cars and two transfer sheds at Nashua Junction, N. H., on the Boston & Maine, on August 1. The fire is attributed to the explosion of a barrel of cement (presumably a rubber cement containing alcohol or a volatile oil). The barrel was leaking and an employee took a lantern into the car when he went to investigate.

The forestry branch of the Canadian Department of the Interior has collected statistics of the tie consumption in Canada for 1910. There were 9,212,962 ties purchased in 1910 by the steam and electric roads of Canada at a cost of \$3,535,228. This is a decrease of 35 per cent. from the number purchased in 1909. The steam railways used 95 per cent. of all the ties, and these ties cost them on the average 38 cents. The electric railway used 302,540 ties—an increase of 183 per cent. over 1909. They paid for their ties 41 cents each.

The old Bureau of Railroads, which was established in the Interior Department in the early eighties for the purpose of looking after the earnings of railways that received financial assistance from the government, has been revived by Secretary Fisher. About fifteen railways are affected by the order. No reports of the gross and net earnings have been received from these roads since 1904, and an attempt will be made to have them submit their back data. Congress, since 1904, has failed to make an appropriation for the maintenance of the bureau and it was allowed to drop into obscurity.

The Long Island perfected plans for eliminating 30 grade crossings near Long Island City. The New York Public Service Commission has granted a certificate of convenience and necessity allowing the railway to change the route of its main line just east of the Sunnyside yards. The change straightens out a sharp curve and makes it simpler to eliminate eight grade crossings. The railway has been negotiating for some time to this end. The other grade crossing eliminations will be made in con-

nection with the other improvements the Long Island has been making between Long Island City and Jamaica.

Last week Governor Dix, of New York, signed the bill authorizing the New York Central & Hudson River to make an agreement with the board of estimate of New York City for the removal of its freight tracks from the surface of Eleventh avenue on the west side of the city. While the measure does not settle the controversy which has been going on for years regarding these tracks, it clears the way for definite negotiations between the railway and the city. Each party has been anxious to get the tracks off the street, but they have been hampered by local politicians and newspapers who have made impossible demands.

The five railwayless counties of southwestern Kansas get more railway surveys and fewer railways than any other stretch of country in the civilized world. During the last twenty years more than twenty-five railways have been surveyed in that section. At the present time six different surveys are being run. At first the settlers out there took the matter seriously and had great hopes. But they pay no more attention now to a surveying party than to a howling coyote. Nearly every township in the five counties has been gridironed with surveys, but before the people get excited again they insist that they must see the rails and ties being laid.

Chicago, Burlington & Quincy train No. 7, a fast mail train running between Chicago and U. P. Transfer, Council Bluffs, has arrived at U. P. Transfer on time every day since March 15, and is still maintaining that record. This is in spite of the fact that it was obliged to leave Chicago late over 27 per cent. of the time, due to waiting for eastern connections. Train No. 15, another fast train between the same points, has maintained a record of reaching Union Pacific Transfer on time 94 per cent. of the time, although delayed in leaving Chicago 27 per cent. of the time. Neither train was late into Union Pacific Transfer a single trip during the month of June.

The Maine courts in sustaining a verdict for the Lewiston, Augusta & Waterville Electric, define the lack of rights of unauthorized persons on the car of a railway company. Isadore Drouin sued the railway for damages sustained while on one of the company's cars. He was in the employ of the street department of the city of Auburn, and was one of a crew receiving gravel which the railway company was hauling for the city and delivering by dumping beside the track. The city's foreman sent workmen, including Drouin, on the cars to clean them out after they had been dumped. The court finds that there is no evidence that he was on the car by "request or consent" of the railway, and, therefore, the railway cannot be held responsible for his injuries.

In addition to the Pennsylvania's superannuation and pension disbursements, the latest reports of the system's relief funds show that since 1886 there have been paid in benefits a total of \$31,006,116. This amount represents benefits paid to members who were incapacitated for work and also to the families of those who died. During the month of June, 1911, \$185,309 in benefits was paid to members or their families on the lines east and west of Pittsburgh. On the lines east, \$132,186 was paid from the relief fund during June. In benefits to the families of members who died \$43,301 was paid, while to members incapacitated for work the benefits amounted to \$88,885. The relief fund of the lines west paid \$53,122 in June, of which \$16,350 was for the families of members who died, and \$36,772 for members unable to work.

Two Head-on Collisions.

On the evening of July 28, a regular southbound passenger train collided with a northbound excursion train near Grindstone, Me., on the Bangor & Aroostook. Eight people were killed and sixteen badly hurt. The engineman of the excursion train and the firemen on both trains were killed. Nearly all the killed and injured were in the smoker of the northbound train; this car was telescoped, none of the other cars being much damaged. It is

understood that the northbound train had orders to take a siding south of Grindstone, the southbound train being the superior train; but that, being behind time, the engineman tried to make the Grindstone siding. Neither train was moving at high speed.

On July 27 an excursion train on the Seaboard Air Line struck a freight train head-on at Hamlet, N. C. Eight passengers (negroes) were reported killed, and 88 people injured, including four trainmen. The excursion train was southbound from Durham. The freight was northbound from Washington and was entering the Hamlet yards at slow speed. The collision was on a curve, and a string of freight cars on the siding cut off the view of each engineman. It is understood that the freight was on the main line without authority.

Pennsylvania Railroad Lost and Found Statistics.

Lost articles are turned in to the parcel room at the Pennsylvania station in New York City at the rate of about twenty a day. Between the time the station was opened, November 27, 1910, and July 12, 1911, 3,630 such articles were received. So far, the most valuable find was a pocketbook containing \$144, which was immediately claimed by its owner. About 18 out of the 20 parcels received daily at this station are called for. When they are brought in they are registered in a book, a duplicate ticket is given to the finder, and a tag bearing the same form and number is attached. If, at the end of 90 days, the owner has not appeared, they go back to the finder. Perishable goods are given to the finder after 12 hours.

In December, 1910, there were 1,204 losses recorded at Broad Street Station in Philadelphia. Of these, 806 have been returned to their owners.

The books in Union Station, Pittsburgh, show that 93 items were recorded during five days taken at random from last May. This is a little less than the average for a like period in New York, and the percentage of those restored to the loser is very much less. Inquiries were received for only 43; the other 50 still remain unasked for.

Canada's Projected Lines.

An active railway construction program is projected for the Dominion generally and for Saskatchewan particularly, in the present fiscal year. In Saskatchewan over 1,000 miles of new line will be laid. Last year, this province led the others with total new track amounting to 476 miles. According to the plans so far announced by the three principal railways of Canada, the Canadian Northern will construct 330 miles in the province, the Grand Trunk Pacific 342 miles and the Canadian Pacific about 350 miles, making a total of about 1,120 miles. In addition to this new construction work, about 1,350 miles of new grading will be done.

Concerning the completion of the Grand Trunk Pacific and the Grand Trunk from ocean to ocean, President Hays, who recently completed a six-weeks tour of inspection of the greater part of the system, says the line will be completed in 1914. This is a year later than the estimate made early in 1910. Mr. Hays explained that in certain sections of the line good construction progress had been made, while in other sections, owing to the difficulties presented by the rough country and also by a scarcity of labor, construction has been carried forward very slowly. Good construction progress has been made on the sections of the road running through the clay belt of Northern Ontario. The main section is completed a considerable distance both east and west of Cochrane, a divisional point, and the present terminus of the Temiskaming Railway. On both sides of the line there is good grazing and farming land. From Winnipeg to Edmonton, over 90 per cent. of the territory on both sides of the line is excellent wheat growing land, while the remaining is adapted to grazing. The present wheat belt and as yet unused fertile land of western Canada extends for about 200 miles west of Edmonton in Alberta, and its opening will serve, in time, to make of that town the distributing center of the Peace river region. This region is rapidly filling up with settlers. The Grand Trunk Pacific will be able to furnish considerable assistance in the movement of the western crop this year. Officials of the road have estimated that between 12,000,000 and 13,000,000 bushels will be moved over their line this year.

This will compare with about 5,575,000 bushels hauled last year. The Grand Trunk Pacific, when completed, will be made up as follows: Moncton to Winnipeg (National Transcontinental, under construction), 1,805 miles; Winnipeg to Edmonton, construction of which section is completed, 793 miles, and Edmonton to Prince Rupert, partly constructed, 962 miles. By the time the main line is finished to the port of Prince Rupert, the company's branch line, from Montreal to the main line will have been built and put in condition to handle traffic.—*Wall Street Journal*.

Notes on Japanese Railways.

Japanese engineers favor the English type of locomotive, principally because the center of gravity is considerably lower, and they feel it is safer on their curves with the narrow gage. I understand that the most satisfactory locomotives ever operated in Japan were built in America from English designs. This information was given me by a firm in Japan which has handled upwards of 4,000 locomotives of various types. That first order of 50 locomotives was followed by orders for some 500 of the same type, and they proved very satisfactory. Locomotive and car works have recently been established, and much new work is done at home.

Station platforms as in England and Europe are level with the car steps. The station master is quite a dignified official, has a uniform and carries a sword on special occasions. The uniform consists of the ordinary regulation blue, with gilt buttons and gold braid, and a bright scarlet band around his cap. He is rather a showy individual when he gets it on, and as he walks along the platform things move. When there is a celebrated dignitary passing through, such as the Emperor or a member of Parliament, he buckles on his sword.

About 130 lbs. of free baggage is allowed on each first-class ticket, and baggage will be delivered by station porters within a radius of four miles at 2½ cents per piece.

Trains are in charge of a guard. Tickets are punched when passengers pass through the wicket on the platform, and given up when passing out at destination. All tickets are good for stop-overs at most stations, within the limits of expiration date, all that is necessary being to show your ticket to the collector at the wicket and pass out. Special platform tickets are issued at one cent each to accommodate those coming with or to meet friends. In that way they take advantage, in a financial sense at least, of the feelings of the people, which in Japan lead them to appear in large numbers when their friends leave or when they wish to welcome someone coming. It is my own recollection that when we left Kure, the naval station, homeward bound, upwards of 100 appeared and lined up on the platform, to say "Good bye" in his best English. It is considered a mark of very great disrespect in Japan not to go to the station to see your friends off.—*James F. Paige*, before New England Railroad Club.

Sale of Stock to Union Switch & Signal Employees.

The Union Switch & Signal Company has set aside 2,000 shares (par value \$50 per share) of its common stock to be sold to employees, and 1,000 shares of common stock are now offered to employees not general officers. Employees are offered the privilege of subscribing for stock at \$75 per share, payment to be made in installments covering a maximum period of 50 months. As soon as 24 per cent. of the purchase price has been paid, all dividends accruing on the stock are credited to the purchaser's account. After the subscription price has been fully paid, if the employee continues in the employ of the company he is entitled to a participation certificate, which entitles him to all cash or stock dividends, and also to voting rights to be exercised through the treasurer. In addition, the company is to declare a \$5 per share dividend each year for five years on the participation certificate; this, of course, in addition to any dividends that are paid on the stock itself. It will be seen, therefore, that the employee will, at the end of the five year period after the completion of his payments, have received his stock at \$50 per share or par. The last allotment of stock of the Union Switch & Signal Company to its stockholders was at 75, and the stock is now selling in the open market in the neighborhood of \$86 per \$50 par value share.

It will be noted that the subscriber gets no interest on the first 24 per cent. of his subscription, but after the first 24 per

cent. is paid, he receives all cash dividends on the full amount of the stock that he subscribed for and is not charged any interest on his deferred payments.

When the stock has been fully paid, stockholders may take stock certificates instead of participation certificates. These stock certificates, of course, are negotiable, while the participation certificates are not negotiable; but if stock instead of participation certificates are taken, the stockholder loses his privilege of getting an extra dividend of \$5 per share for each year for five years.

If a subscriber leaves the employ of the company, or wishes to discontinue his subscription before the full amount is paid up, or dies, he or his heirs are entitled to receive the full amount of money that he has paid in, with interest at 5 per cent.

Employees who are getting \$1,000 a year or less are offered five shares or less; employees who are getting \$3,000 a year are offered 5 shares for the first \$1,000 of salary, and one additional share for each additional \$250 of salary or fraction thereof; employees who are paid more than \$3,000 have the right to subscribe for 13 shares for the first \$3,000 of salary and one additional share for each additional \$500 of salary—the maximum subscription, allowed, however, for employees of any class is 20 shares.

Completion of the Kinshu Railway.

The section of the Kinshu Railway, Japan, which has been up to this time winding between Hitoyoshi and Yoshimatu, and which was begun in the first half of 1906, was finished last November. The completion of the section, which is 21 miles long, was not expected before this year, but the difficulties that were offered by the mountainous district through which it passes, were more rapidly overcome than was at first believed possible. There are in all through the Yataka mountains 21 tunnels, with a total length of 4.19 miles. The railway attains at the point of the highest tunnel an altitude of 1,776 ft. above the level of the sea; the Hitoyoshi station is only 295 ft., and that at Yoshimatu 210 meters, or 689 ft., above the sea. The new section was given over to traffic on November 20. On the same day there was an opening celebration in Edgoshima. With the opening of this section there will be direct railway communications between Moji and Kagoshima, and also with the railway to Tokio, on the main island. The governmental authorities intended to operate through trains, which will make this entire run of 327 miles in 13 hours.

Further, it is intended to make regular steamer communication with the railway from Kagoshima and Formosa. When this is done, the present direct steamer connection between Mojit and Formosa will be discontinued.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., Sept. 19, 1911.
 AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.
 AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September.
 AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York; October 9-13, Atlantic City, N. J.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York; November 15, Chicago.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 17-19, 1911, St. Louis, Mo.
 AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.
 AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
 AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York; 3d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
 ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; annual, November 6-10, Chicago.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York; December 12-13, Louisville, Ky.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug., Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLead, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.
 CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.
 CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.
 ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, Buffalo, N. Y.
 GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
 INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio; annual, Aug. 15, Toledo, Ohio.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.
 MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.
 MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; Sept. 12-15, 1911, Atlantic City, N. J.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.
 NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. & M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.
 OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.
 RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
 RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.; annual, Oct. 10, Colorado Springs, Colo.
 RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.
 RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.
 ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; September 12-15, St. Louis, Mo.
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Sept. 12-14, St. Paul, Minn.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; annual, October 20, Atlanta, Ga.
 SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.
 TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.
 TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.
 TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.
 TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly, Pittsburgh.
 TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.
 TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.
 TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; annual, August 29-September 1, Chicago.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.
 WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.
 WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, First National Bank bldg., Chicago; annual, January 16-18, Chicago.

Traffic News.

The assistant attorney general of Washington has told the Washington Public Service Commission that in his opinion railroads and steamship companies cannot legally exchange with newspapers intrastate transportation for advertising.

The Board of Supervisors of Denver, Colo., have appropriated \$500 to engage a lawyer to compel the Colorado & Southern to carry freight between Denver and points on the line running via Leadville to Breckenridge. This line is the old Denver, South Park & Pacific.

The Missouri Pacific and the Texas & Pacific are to put in operation a through dining car service on their trains between St. Louis and New Orleans; and a through dining car service is also to be put in operation between New Orleans and El Paso on the Texas & Pacific.

The Atchison, Topeka & Santa Fe has reduced its first and second class rates from El Paso, Tex., to points between Belen, N. Mex., and Clovis by 18 cents; its third class rates by 17 cents; its fourth class rates by 19 cents; its fifth class rates by 5 cents, and its class A rates by 12 cents per 100 lbs.

The American Hawaiian Steamship Company has leased about three acres of water frontage at Los Angeles from the Southern Pacific, and it is surmised that hereafter the company will make Los Angeles a port of call. At present freight for Los Angeles is delivered to the Atchison, Topeka & Santa Fe at San Diego.

The government of Canada has decided to rebate the duty on bituminous coal brought into Manitoba, Saskatchewan, Alberta and Eastern British Columbia from the United States within the next two months. This is in consequence of the failure of coal miners and mine operators to settle the strike in the Alberta mines, which has been carried on throughout the summer.

Representative Adamson of Georgia, a member of the Interstate and Foreign Commerce Committee, has introduced a resolution in the lower house of Congress, authorizing the Interstate Commerce Commission to make a valuation of all railways in the United States. The information was obtained "to be submitted as prima facie evidence of facts in investigations or trials before the Interstate Commerce Commission, or in any court."

In the 12 months ended June 30, 1911, the total value of manufactures exported from the United States was \$910,000,000, of which \$601,000,000 was manufactures ready for consumption and \$309,000,000 manufactures for use in further manufacturing. This is the largest total value for any year in the history of the country, and also represents a larger gain over the previous year than has ever been made before. The increase over 1910 was \$143,000,000, or about 18½ per cent.

The Philadelphia & West Chester Traction Company began on August 1 a freight service between West Chester and Sixty-third street and Market street, Philadelphia. There will be an interchange of cars at Sixty-third street with the Philadelphia Rapid Transit, which will haul cars and freight from and to its main freight station at Front and Market streets. It is said that this is the beginning of a general scheme to extend freight service by trolley to a number of towns in Pennsylvania.

A press despatch from Monterey, Mex., says that experts employed by the United States government are investigating the quarries in Monterey with a view to obtaining supplies of stone for the jetties and other harbor works at Galveston, Tex., and Aransas Pass. The stone for Galveston has heretofore been obtained from quarries near Llana and Marble Falls, Tex. The Texas Railroad Commission sometime ago authorized a large increase in the rates on stone for a haul of less than 200 miles.

The completion of the extension of the St. Louis Southwestern from Gatesville, Tex., to Comanche, together with other branches built by the St. Louis, Southwestern, puts the road in a position to handle a great part of Arkansas rice shipments. More than 65,000 acres of rice lands are now in cultivation in Arkansas,

while seven years ago there were none, and it is estimated that only about 10 per cent. of the land which could be used to raise rice is now under cultivation, and it is claimed that 85 per cent. of the total cultivatable rice lands are tributary to the St. Louis Southwestern's lines.

It is understood that the Atchison, Topeka & Santa Fe and the St. Louis & San Francisco have made a arrangement by which a through passenger train is to be run beginning in the latter part of this year between New Orleans, La., and Los Angeles, using the Frisco out of New Orleans and the Coleman cut-off of the Atchison, Topeka & Santa Fe. This would bring the Santa Fe in competition for passenger business with the Southern Pacific's through trains from New Orleans to Los Angeles and San Francisco. Roughly the distance from New Orleans to Los Angeles by the Santa Fe-Frisco line would seem to be 2,202 miles, as compared with 2,003 by the Southern Pacific.

For use in July, 19,496 commutation tickets were sold by the Long Island Railroad. This is the greatest number of commutation tickets ever sold on the Long Island in one month, being 2,142 more tickets than were sold in any one month last year. This gain in commutation traffic is attributed to the opening of the Pennsylvania East river tunnels which, of course, very much shortens the time between Long Island and the uptown business district of Manhattan, but does not shorten the time between the downtown business district and Long Island points. The subway to Flatbush avenue, Brooklyn, and the electric service between there and Jamaica is still the quickest way to get from the Battery to points in Long Island.

An inexhaustible source of editorials for southeastern daily papers has been a comparison of the methods of the Canadian Pacific and the Southern Railway in colonization work. In reply to criticism in a more than ordinarily progressive Southern newspaper, President Finley said: "In comparing the work of this character being done by the railway companies of the Southeast with that being done by the Canadian company referred to, and by some of the western transcontinental lines in the United States, we should not lose sight of the fact that many of these western lines, both in the United States and Canada, are owners of large tracts of agricultural lands, granted to them in aid of their construction. The revenues which they obtain from the sale of these lands constitute funds on which they can draw for expenditures in connection with the solicitation of immigration and other development work. The companies operating in the Southeastern states, however, must draw on their operating revenues for all expenditures of this character. The western lines, in addition to the money realized from the sale of lands, for use in the solicitation of immigrants, are in position to offer their own lands direct to immigrants at definite prices; whereas, the lines of the Southeast, having no such large bodies of lands of their own, can do no more than bring prospective buyers into touch with those having lands for sale.

F. W. Stevens, chairman of the New York Public Service Commission, Second district, in a talk delivered at the Chatauqua at Jamestown, N. Y., recently said: "I have never believed for a moment the oft repeated sentence, 'A public officer is a public servant.' A public officer is a man named to an office wherein he is to exercise his own best judgment in performing his duties, and if he responds to any demand or clamor in opposition to his own judgment of what is best and right, then he is betraying the most sacred trust. The work of the Public Service Commission is in the nature of a court, and its decisions are based on evidence and facts placed before it and are not influenced by public clamor or personal influence, no matter from what sources. Distrust the public official who keeps in the limelight; it is bad for the sight, bad for the hearing, and conducive to a big head. When you find a public official who prefers the limelight, it is a good thing to keep him there and get some other person to perform the duties of his position. The work of our commission can be summarized in part by referring to honest capitalization, end of rebating, reduction of complaints, better understanding between the public and corporations, better service, trains on time, new stations, protection at crossings. The chief functions of the commission are threefold: First, to act as a tribunal for the adjustment of differences between the public and corporations; second, requiring honest capitalization; third, controlling rates and service.

Immigration Traffic Increase.

The following is a comparative statement of passenger revenues of the six important trunk lines operating out of New York for the 11 months ended May 31 of this year:

	1911.	Increase.	P. C.
Delaware, Lack. & Western..	\$6,934,250	\$557,910	8.6
Erie	8,266,415	374,934	4.8
Lehigh Valley	4,111,739	198,499	5.1
New York Central & H. R....	28,161,961	1,238,808	4.2
New York, New Haven & H..	23,977,622	1,217,039	5.3
Pennsylvania R. R.....	30,302,413	1,726,119	6.0

Since its withdrawal from the immigrant pool several months ago the Lackawanna has been getting the greater part of the traffic by having its independent office on Ellis Island, which, in some measure, it is understood, accounts for the showing made in increase of passenger revenue.

The same is also true of the Lehigh Valley, which followed the example of the Lackawanna, and to some extent cut down the latter's advantageous position. Previous to these withdrawals the Erie had been the leader in the handling of this class of business.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association in presenting statistical bulletin No. 99-A, giving a summary of car shortages and surpluses by groups from March 30, 1910, to July 19, 1911, says:

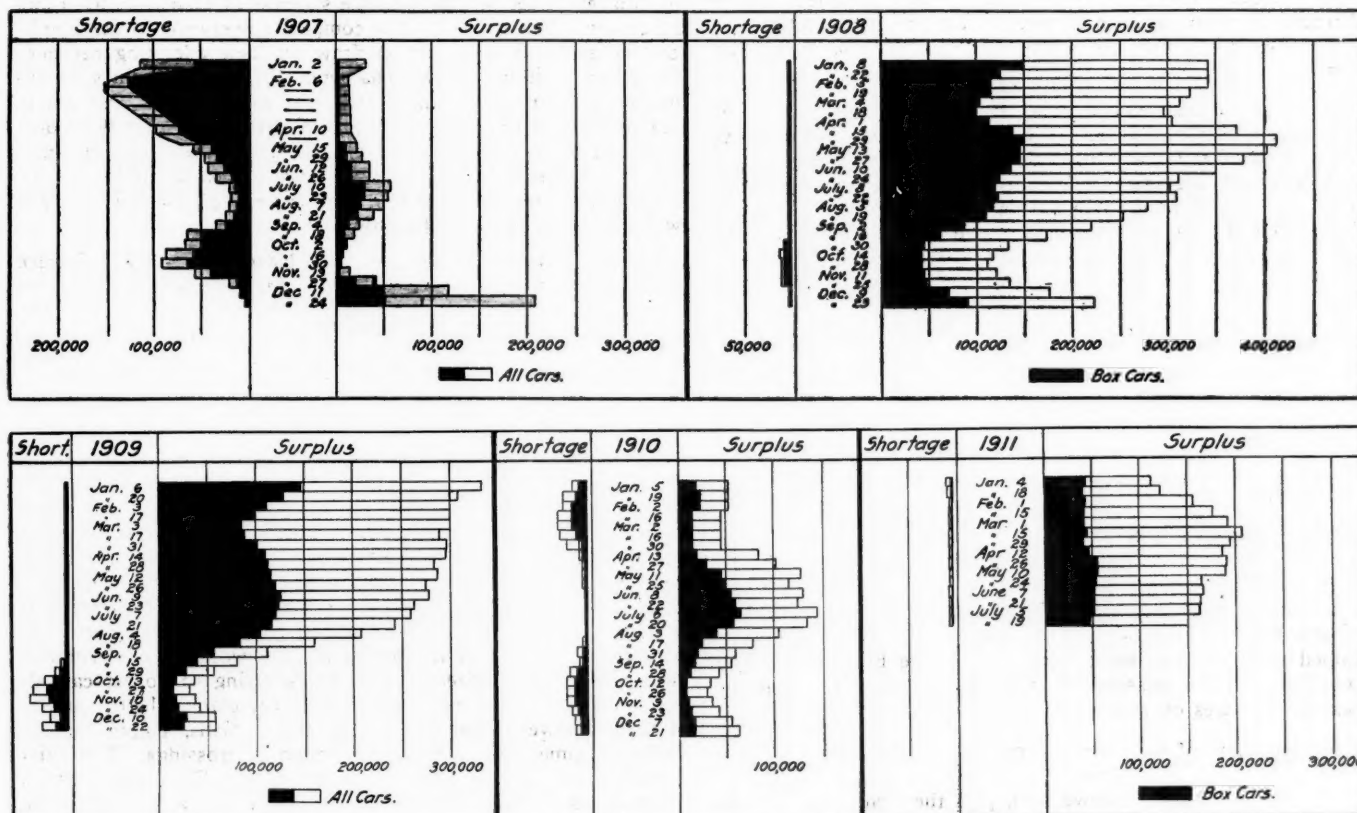
"The total surplus for the date of this report is 150,433, a decrease of 15,075 since our last report. Of this decrease 7,674 are coal and gondolas, and 6,200 box cars. There are also slight decreases in flat and miscellaneous cars. The bulk of the decrease in box cars is in groups 3 (Central), 5 (Southern), and 10 (Pacific), while the coal car decrease is general. There are also some scattering shortages which are as yet unimportant. A study of the charts for previous years shows that without exception the decrease in surplus has started with either the first or second period in July, and the reports seem to indicate a similar tendency in the supply this year."

The accompanying table gives surpluses and shortages by groups in the last period covered by the report, and the chart shows total bi-weekly figures in 1907 to 1911.

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses					Shortages				
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—July 19, 1911.....	7	2,057	702	1,484	294	4,537	25	13	275	0	313
" 2.—" 19, 1911.....	25	3,328	129	15,746	5,437	24,640	0	0	389	5	394
" 3.—" 19, 1911.....	26	7,544	751	32,694	3,499	44,488	22	0	0	3	25
" 4.—" 19, 1911.....	10	1,817	214	2,094	1,281	5,406	23	0	0	0	23
" 5.—" 19, 1911.....	19	2,580	320	2,430	1,534	6,864	10	0	0	0	10
" 6.—" 19, 1911.....	25	10,672	821	3,294	7,602	22,389	2	22	0	5	29
" 7.—" 19, 1911.....	4	1,771	96	648	937	3,452	0	0	0	0	0
" 8.—" 19, 1911.....	17	6,803	206	2,116	4,086	13,211	0	0	0	0	0
" 9.—" 19, 1911.....	11	2,266	541	388	939	4,134	0	0	0	0	0
" 10.—" 19, 1911.....	21	7,205	1,212	1,768	9,618	19,803	10	0	0	0	10
" 11.—" 19, 1911.....	7	632	221	27	629	1,509	487	70	0	0	557
Total	172	46,675	5,213	62,689	35,856	150,433	579	105	664	13	1,361

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907 to 1911.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JUNE, 1911.

MONTH OF JUNE, 1911.																	
Name of road.	Mileage operated at end of period.	Operating revenues			Total, inc. misc.		Maintenance of way and structures.		Trans- portation.		General.	Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
		Freight.	Passenger.														
Alabama Great Southern.....	309	\$204,821	\$103,262	\$346,246	\$32,759	\$72,680	\$9,663	\$123,097	\$8,988	\$247,187	\$99,059	\$247,187	-\$2,622	\$13,241	\$83,196	-\$8,257	
Bessemer & Lake Erie.....	203	815,882	29,885	845,570	92,686	157,428	10,270	207,977	9,189	458,195	306,375	458,195	—	16,000	390,375	—107,558	
Buffalo, Rochester & Pittsburgh.....	572	644,989	88,485	762,152	17,073	171,507	10,626	219,468	15,737	157,379	168,899	157,379	—	973	151,926	—41,270	
Chicago & Erie.....	269	343,193	61,511	449,058	39,169	27,349	20,290	182,342	8,411	277,395	171,663	277,395	—	16,144	155,519	26,307	
Chicago & North Western.....	7,743	4,090,606	1,729,022	6,401,845	1,029,137	737,549	91,499	2,320,906	131,485	4,310,576	2,091,269	4,310,576	—	244,033	1,837,566	53,981	
Chicago, St. Paul, Minneapolis & Omaha.....	1,744	601,020	336,055	1,218,446	304,524	135,313	26,386	449,531	42,111	957,865	260,581	957,865	—	58,186	196,793	—135,645	
Cincinnati, Hamilton & Dayton.....	1,014	601,824	136,223	836,580	90,211	139,513	15,594	346,978	19,245	346,978	225,039	346,978	—	87,520	186,413	150,425	
Cincinnati, New Orleans & Texas Pacific.....	337	575,565	137,589	762,840	69,427	186,959	21,701	236,397	20,815	525,299	225,541	525,299	—	15,667	222,467	—87,520	
Cleveland, Akron & Columbus.....	212	148,403	49,788	212,448	44,537	29,902	1,594	66,423	3,690	147,146	65,302	147,146	—	2,708	56,302	—9,946	
Colorado Midland.....	337	99,809	28,153	142,492	33,325	17,557	3,209	62,536	6,033	127,650	14,842	127,650	—	2,708	11,144	—26,785	
Cumberland Valley.....	162	181,537	52,708	245,901	58,510	26,079	4,883	68,469	12,609	170,550	75,351	170,550	—	5,141	70,507	—12,590	
Delaware & Hudson Co.—R. R. Dept.....	819	1,478,682	236,111	1,780,641	136,570	285,034	21,020	592,196	45,693	1,060,513	700,128	1,060,513	—	1,830	654,503	139,012	
Duluth & Iron Range.....	191	827,900	23,111	859,948	111,759	58,353	1,109	26,278	9,363	306,862	653,086	306,862	—	34,588	623,823	—243,595	
Duluth, Missabe & Northern.....	316	1,005,321	40,933	1,055,027	101,580	75,783	1,613	136,774	10,269	336,019	729,008	336,019	—	41,164	696,561	—95,280	
Elgin, Joliet & Eastern.....	831	664,897	77,414	742,311	409,451	689,053	97,234	1,301,347	81,002	2,578,087	312,822	2,578,087	—	30,909	1,692,002	199,266	
Erie.....	1,939	3,100,346	774,184	4,191,119	409,451	689,053	97,234	1,301,347	81,002	2,578,087	312,822	2,578,087	—	30,909	1,692,002	199,266	
Fort Worth & Denver City.....	454	197,214	124,976	341,045	23,854	19,994	47,174	371,174	17,162	667,109	287,482	667,109	—	1,529	266,556	—135,012	
Grand Rapids & Indiana.....	587	206,081	140,360	376,124	50,117	62,753	10,942	153,357	13,739	290,908	85,216	290,908	—	2,312	59,424	—32,583	
Kansas City Southern.....	827	541,694	134,600	763,943	44,959	128,177	27,993	252,354	28,737	482,220	281,723	482,220	—	34,612	247,111	—7,428	
Long Island.....	395	268,768	705,501	1,023,966	110,528	102,132	20,533	402,626	23,526	659,345	364,621	659,345	—	53,333	404,895	—73,985	
Long Island.....	395	268,768	705,501	1,023,966	110,528	102,132	20,533	402,626	23,526	659,345	364,621	659,345	—	53,333	404,895	—73,985	
Monongahela.....	65	84,044	2,105	87,459	19,994	7,760	194	19,430	2,000	49,378	38,081	49,378	—	1,900	36,181	—135,012	
New York, Chicago & St. Louis.....	561	750,889	168,192	954,591	135,927	95,671	47,174	371,174	17,162	667,109	287,482	667,109	—	1,529	266,556	—135,012	
New York, Philadelphia & Norfolk.....	112	243,343	32,409	298,705	38,458	51,999	4,777	121,634	11,142	227,410	71,295	227,410	—	9,610	61,885	—15,950	
New York, Susquehanna & Western.....	152	168,483	50,395	246,563	5,745	25,422	1,939	85,798	4,352	123,256	123,307	123,256	—	17,196	109,822	—9,882	
New York, Susquehanna & Western.....	152	168,483	50,395	246,563	5,745	25,422	1,939	85,798	4,352	123,256	123,307	123,256	—	17,196	109,822	—9,882	
Norfolk Southern.....	607	172,475	65,946	258,410	37,927	56,514	6,291	81,466	11,731	164,330	94,080	164,330	—	1,470	87,326	—9,882	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,604	359,245	2,895,610	466,906	265,014	49,766	861,222	66,093	2,009,001	886,609	2,009,001	—	11,731	1,663,142	—44,660	
Norfolk & Western.....	2,004	2,438,															

Condition of the Cotton Crop.

August 2, 1911, 12:00 Noon.

The crop reporting board of the United States department of agriculture estimates that the condition of the cotton crop on July 25 was 89.1 per cent. of a normal, as compared with 88.2 on June 25, 1911; 75.5 on July 25, 1910; 71.9 on July 25, 1909, and 79.4 the average of the past ten years July 25.

Comparisons of conditions, by states, follows:

States.	July 25, 1911.	June 25, 1911.	July 25,		
			1910.	1909.	Ten-yr. Av.
Virginia	102	98	80	71	81
North Carolina	87	89	71	71	79
South Carolina	86	84	70	77	79
Georgia	95	94	70	78	80
Florida	95	96	70	84	82
Alabama	94	93	71	68	79
Mississippi	86	87	71	64	79
Louisiana	84	89	69	58	78
Texas	86	85	82	70	79
Arkansas	94	89	73	76	79
Tennessee	92	87	76	80	82
Missouri	96	90	72	85	83
Oklahoma	88	87	87	79	81
California	99	100	98	..	..
UNITED STATES	89.1	88.2	75.5	71.9	79.4

Keeping Everybody in Business.

The principal cases of complaint of existing rates that have been brought before the Interstate Commerce Commission during the past several years have been those of communities dissatisfied with relative rate adjustments that they think have placed their producers and merchants at a disadvantage in competition with competing merchants and producers of other communities.

Arguments advanced by the shippers in such cases have often been based upon what they designate as their "natural advantages of location." They have complained against the railways for endeavoring to deprive them of the "natural advantages of location." It is usually considered commendable for an individual to endeavor to overcome natural disadvantages, whether entailed by physical infirmity, lack of training, or other handicap. Spectacles, ear-trumpets, wooden legs, study, application, the saving of money, are all devices for overcoming natural disadvantages, and the person who by use of such a device is enabled to hold his own in a field with those more favorably endowed is usually accorded credit rather than discredit. If he has the ability to perceive his natural disadvantages and the will to overcome them, all the better for him. Now many railways have been built either to overcome the natural disadvantages of a community or to afford opportunity for the use of natural advantages. Indeed, they have never been built for any other reason. The Baltimore & Ohio was constructed to bring to Baltimore traffic which was going to Philadelphia. The first railways from Boston, New York, Chicago and other cities were built to overcome the natural disadvantages of those cities or to promote their natural advantages. When capital, energy, and enterprise have combined to provide a community with railway transportation what is to be the limit to the benefit to which it is entitled from the advantage thus gained? It is to overcome the natural disadvantages that the government spends millions of dollars to improve a harbor here and a river there. Bridges are built and tunnels are bored to overcome such natural disadvantages, as the great Shoshone dam was built and irrigation provided to reclaim the thousands of square miles of arid West. The more we reflect the clearer is our perception that all of the effort that has led to what we call civilization has been to overcome natural disadvantages.

Now a railway serving a particular community finds it to its interest to enable that community to place its products in the widest markets. It is the pursuance of this policy that has developed the industry and commerce of the United States. The clamor of shippers to be protected in the natural advantages of location would seem to be a confession of weakness, for if the natural advantages of location were reinforced with strength, skill, foresight and industry, there would seem little need for them to cry for governmental protection. Natural advantages and economic strength are not synonymous. It would seem that a railway company is justified in promoting the interests of the communities which it serves so long as it is not obliged to carry their traffic at a positive loss, but with a reasonable profit. To

rule otherwise is to do for the communities of this country what the trades unions do for their members, reduce their energy and ability to the dead level that stifles enterprise.

Yet it is hardly an exaggeration to say that it is the desire of the weak for protection against the strong that had underlain all the clamor against the railways. That the weak should be protected from rapacity and injustice is perhaps the motive that underlies nearly all of law, but at the same time that strength, skill, foresight, wisdom and perseverance should be protected in the rewards that accrue to these qualities is essential to the progress of civilization. That railways should charge the same rates under the same conditions to all alike; that by secret practices and stealthy devices one should not be favored at the expense of another is any obligation of the public character of their service. To protect the weak against the strong at all times, under all conditions and by all means is to reverse the process of evolution, to promote the survival of the unfit.—L. E. Johnson, before the Southern Shoe Wholesalers' Association.

A Farmers' Market Bureau.

B. F. Yoakum, in an address before the Texas Farmers' Congress, at their annual meeting at College, Tex., said in part:

"The farmers do not get as much as they should for their products, and no one can improve this but the farmers themselves. According to government reports, the producer receives 46 cents for products of the farm for which the consumer pays \$1.00.

"Last year's agricultural products were worth \$9,000,000,000 to the farmers. Assuming that the farmers kept one-third of the products for their own use the consumers paid over \$13,000,000,000 where the producers received \$6,000,000,000. The cost of getting the year's products from producers to consumers amounted to the enormous sum of \$7,000,000,000. The real problem to deal with is not high cost of living. It is high cost of selling.

"The business end of husbandry has been sadly neglected, and that is the chief reason why agricultural growth makes such a poor showing in comparison with other national developments. To receive better prices, farmers only have to copy what others are doing successfully. For instance, the people of Denmark thirty years ago received \$12,000,000 for their butter, eggs and bacon. Then they began the organization of market societies. Now the same character of products brings in over \$100,000,000 a year. There is no such talk of high cost of living in that little country because they have a system of economical marketing. The farmers there have organized under trust methods.

"The co-operative creamery and co-operation in marketing fruits, vegetables, grain, cotton and other products is sure of success when practiced under correct business rules. Add ice storage, poultry and egg distribution facilities and the marketing plant becomes complete.

"It will be urged by some that development of thousands or hundreds of thousands of these farm market places to the limit of their usefulness will result in damage to existing business. This alarm is not warranted. Commerce is always aided and not retarded by labor saving machinery and reductions in cost of distribution. In England, Scotland and Ireland there are 1,500 co-operative stores with a membership as large as the population of Texas—eight million people receiving the profits. They do a business of more than \$500,000,000 a year.

"These neighborhood marketing establishments will place every farmer with ten or forty acres on the same footing as another with more land and greater harvests.

"The government should assist in finding a way for better farm marketing. There should be a market bureau of the Agricultural Department devoted to accumulating and distributing information on best methods and best markets for selling."

INTERSTATE COMMERCE COMMISSION.

The commission has further postponed from September 2 to March 2 the advance in rates on ice that were filed by the Chicago & North Western.

The Greater Des Moines Committee has complained to the Interstate Commerce Commission of the rates from Des Moines to Colorado common points, as compared with the rates from Missouri river cities.

Mileage operated on June 30, 1910—17,623 miles; 1,036 miles; 3168 miles; 4293 miles; 5781 miles; 6196 miles; 6444 miles.

The commission has further suspended the advance rates filed by the Missouri Pacific and the St. Louis, Iron Mountain & Southern on cotton from the southwest to New England points, from August 15 to February 15, 1912.

The commission has granted an extension of time to September 1 as the effective date for its order requiring all of the roads operating into Nashville, Tenn., to cease giving re-shipping privileges on grain and hay at that city.

The commission has granted permission to the Central of New Jersey to continue to charge a higher passenger rate from New York City to Bound Brook, N. J., and a higher joint passenger rate with the Baltimore & Ohio to points beyond Pittsburgh, Pa., than the sum of the intermediate fares, providing the joint through fares now in effect are not exceeded.

The commission has granted the application of the Southern Railway to charge a lower rate on stone and granite from Chester, S. C., Spartanburg and Winnsboro, to all points of destination in the West and North than are in effect to intermediate points. Permission was given in order that South Carolina producers might be given a chance to compete in the markets with the producers of North Carolina and Georgia.

The commission has denied the request of the New York Central & Hudson River, and connections, to charge 7.8 cents per 100 lbs. on coarse salt in bulk, from Syracuse, N. Y., to Detroit, Mich., at the same time that higher rates are charged to intermediate points. The petition justified the lower rate on the ground that Syracuse would then be given a chance to compete with other shipping points in New York in Detroit markets.

The commission has suspended until November 29 the tariffs filed by western lines cancelling the class rates from St. Paul, Minn., Duluth, Winona and similar points to Buffalo and Pittsburgh and other points east. The western roads had through class rates to about 7,000 points in eastern, central freight association territory and trunk line territory. The tariffs which have been suspended by the commission cancel rates to about 2,000 of these points.

A general denial of all applications by express companies for relief under the long and short haul provision of the law has been entered by the commission in cases where commodities are shipped from points of production to points of consumption, the same or similar rates not being applicable to or from intermediate points. It was not shown by the applications what particular rates they were intended to cover, and the commission declines to flatly grant any general permission under the law.

The National Mohair Growers' Association has complained to the Interstate Commerce Commission against the rates on mohair from the goat-raising territory west of the Mississippi to Boston, Providence and New York.

The Consolidated Fuel Company and the Castle Valley Coal Company have complained to the Interstate Commerce Commission against the present rates on coal out of southern Utah. The commission has begun a special investigation.

The American Hardwood Lumber Company and other shippers in Arkansas and Louisiana have made a complaint to the commission against the rates on lumber to the New England states, New York and eastern states as far south as Virginia and West Virginia.

The commission is to begin an investigation of the rates and business of the Texas City Terminal Company. This investigation follows a complaint made by the railways against the Galveston Wharf Company, which said that an increase of about 100 per cent. in the charges of the Galveston company was unreasonable.

Commission merchants doing a business in fresh fruits in New York have complained to the commission against the freight rates on watermelons and canteloupes shipped from southern points to northern and eastern markets. Recently the railways made a reduction in the rate on melons, but refused to deliver them in New York City, the tariffs reading to Jersey City.

The Allanwood Iron & Steel Company has filed with the commission a complaint against the Pennsylvania Railroad and the Philadelphia & Reading which alleges that these railway companies, in granting certain switching allowances to steel companies allied with the United States Steel Corporation, were guilty of discrimination, and the complaint asks for reparation.

Exceptions to the Long and Short Haul Clause.

In re rates that are carried from producing points to consuming points, and that are not made applicable from or to intermediate points. Fourth section order of the commission.

The commission is of the opinion that situations in which rates are carried from producing points to consuming points and are not made applicable from or to intermediate points for the sole reason that the intermediate points are not producing or are not consuming points, do not constitute special cases within the meaning of the fourth section of the act to regulate commerce, as amended June 18, 1910, and that such rates should be made applicable from or to the intermediate points, or else that the tariffs containing these rates should be corrected by the addition of rule 77 of Tariff Circular No. 18A.

It is therefore ordered that, in all those instances where commodity rates are made from producing points to consuming points, and are not made applicable from or to intermediate points for the sole reason that the intermediate points are not producing or are not consuming points, such portions of the applications, general in character, by which these rates are sought to be protected, be, and the same are hereby, denied, effective January 1, 1912.

The Commission Claims the Right to Decide on Reasonable Commutation Rates.

Investigation and Suspension Docket Nos. 1 and 8. Opinion by Commissioner Harlan:

There were filed with the commission on June 23, 1910, ten petitions against the Erie, the Delaware, Lackawanna & Western, the Pennsylvania Railroad, the Central of New Jersey, the Philadelphia & Reading, the Lehigh Valley, and the New York Central and Hudson River, as lessee of the West Shore, in seven of which the board of railway commissioners for the State of New Jersey was complainant. The allegation running through them all is that the proposed new commutation fares between New York city and points in the State of New Jersey were extortionate and unreasonable.

The tariff schedules naming the new fares were evidently prepared after a full conference and agreement among the carriers; they were filed on May 22, 23, 26, and 29, 1910, and by their several terms were to become effective on or shortly before July 1, a few days, as will be observed, after the complaints were filed.

The purpose of the carriers to increase the fares had been made known in advance. In compliance with numerous petitions to suspend the operation of the new fares, an order was entered on June 23, the date on which most of these petitions were filed. It provided for the postponement of the effectiveness of the schedules until October 15, 1910.

As we understand the attitude of the defendants, it is admitted that commutation fares are fully subject to the provisions of sections 2, 3, and 4 of the act, and that the commission may exert its full authority when they are in violation of either of those provisions; but it is insisted that section 1 has only a limited application to such rates. This contention, expressed in another way, means that under the language of section 22 the issuance of mileage, excursion, or commutation passenger tickets at a lower price than the normal fare is a right that may be exercised by the carrier in its sole discretion without hindrance or control by the commission, so long as the normal fare between the same points is itself reasonable and so long as the rules and regulations governing the use of such tickets do not offend the provisions of sections 2, 3, or 4 of the act. As originally enacted in 1887, section 22 contained this provision:

That nothing in this act shall apply to . . . the issuance of mileage, excursion, or commutation passenger tickets.

It had been contended in some quarters that the language of the original act took commutation, mileage, and excursion tickets entirely out of the law, and that carriers were not required even to publish or post such rates; and to meet the point the section was amended on March 2, 1889, so that the clause now reads as follows:

That nothing in this act shall prevent . . . the issuance of mileage, excursion, or commutation passenger tickets.

In its amended form the clause was first construed in *In re Pas-*

senger Tariffs, 2 I. C. C. Rep., 649; 2 I. C. C. Rep., 445. This was not a contested case, nor was there any formal complaint. It was merely the response of the commission to an informal inquiry in which among other questions asked was this: Shall round-trip tourist rates be published and posted in the same manner as one-way through rates?

A case that touches the question more closely and is strongly relied upon by the defendants in support of their contention that the commission is without such jurisdiction over commutation fares is *Spriggs v. B. & O.*, 8 I. C. C., 443. The defendant there had withdrawn from sale the 180-trip quarterly ticket which, for several years, had been available over its lines between Washington and Baltimore. After explaining the contention of the complainants that as carriers are permitted to sell commutation tickets they may therefore be compelled to do so, and that if a carrier has sold such tickets for a considerable period it may be required to continue to sell them at less than the general public fares, the commission says, p. 452:

"There is no legal basis for such a contention. If we had full rate-making power as ample and complete as that possessed by the congress, we could not make such an order. We could in that case prescribe a rate which would be reasonable for everybody to pay . . . but we could not under any circumstances compel the granting of a special and lower rate for the benefit of a particular class."

Again at page 450 it is said:

"Carriers are allowed to issue mileage, excursion, and commutation tickets, but ordinarily they cannot be compelled to do so. The permission does not create an obligation."

Apparently even the right to correct an undue preference in commutation fares is claimed by the commission in that case with some hesitation. It is to be noted, however, that the defendant had not withdrawn all its commutation fares, but only its 180-ride quarterly ticket. The real point in the case, so far as that contention is concerned, seems to be expressed at page 52, where it is said:

"The commission has no power to prescribe rates for the future. . . . The Supreme Court has distinctly held that our power does not go to that extent."

That is as far as the prayer of the complainant required the commission to go, and that, perhaps, is to be regarded as the real ruling in the case.

From this review of the few complaints that have come before us involving the effect and meaning of section 22, it will be seen that the precise question now in hand has never been squarely considered and decided. In 1900, when *Spriggs v. B. & O.* was before us, the commission was without authority to enter an order fixing a reasonable rate for the future.

Another case strongly relied upon by the defendants is *L. S. & M. S. v. Smith*, 173 U. S., 699. The case, however, involved mileage tickets which, we must repeat, differ very essentially in character from commutation tickets.

It will not be necessary to dwell here upon the importance of the question not only to the particular suburban communities involved on the record before us, but to many other such communities throughout the country, the prosperity and growth of which largely depend upon an efficient and reasonable commutation service.

Nor need we stop to point out the distinction between commutation tickets on the one hand and excursion and mileage tickets on the other. Compared with the normal one-way fare all such tickets may be said to be abnormal. But the resemblance stops at that point. Although they are mentioned together in section 22, the force and effect of that provision must necessarily differ with the differing character of the several kinds of tickets. It seems to be settled under that section that a carrier may enter upon the policy and practice of issuing mileage books and excursion tickets at less than its regular normal fare for the one-way journey, and, having adopted such a policy, may subsequently withdraw from it and refuse longer to issue such tickets. It by no means follows, however, that a carrier under section 22 may exercise the same scope and freedom of action with respect to commutation tickets.

The literature relating to the origin and history of commutation rates is surprisingly meager and incomplete. As applied to passenger traffic, commutation seems to signify the payment in a single sum of the cost to the traveler for transportation, limited in point of time or in the number of trips, between two des-

ignated points; apparently it implies also a fare per trip that is less than the normal fare for a one-way journey. That use of the word is probably as old as steam transportation itself; the commuter not improbably antedates steam transportation although possibly not under that name.

An interesting account of the steps taken to build up suburban traffic is found in the history of the Old Colony Railroad. With the object of inducing a large class of artisans, who worked in shops in Boston, to move their families into the country, the company agreed to transport them back and forth daily at a charge closely approximating the actual cost of the service. It did this on the theory that the natural increase of general traffic that would come from the closer settlement of the country it served would justify such an arrangement.

A circular letter, complaining of abuses practiced by commuters, issued in 1856 by the president of the New Jersey Railroad & Transportation Company, now a part of the New Jersey division of the Pennsylvania Railroad, indicates that commutation tickets were first sold on that system in 1839 in order "to accommodate heads of families doing business in New York who desire to purchase or rent residences in New Jersey." During the first year or two annual tickets only were issued, and there were but three commuters. Subsequently the privilege was opened to all persons, whether heads of families or not, and half yearly tickets were introduced.

With the increase of commuters the circular states that—"quarterly commutations were granted for reasons of convenience and advantage to commuters."

At this time the number of persons holding commutation tickets was so small that they were individually known to the conductors and were not required therefore to exhibit their tickets when on the trains. But after a few years the number had so increased that, as the circular states—

"The conductors can no longer distinguish the commuters, and it has become indispensable to adopt more safeguards, as many persons were known to be riding without any right whatever, and some, after passing themselves off for a year, had the effrontery to boast of it in their congenial circles. Persons who had been commuters had continued on after their privilege had ceased, for a number of months, and in one instance for a year and a half before he was discovered, though riding with the oldest conductor. It is due to him, however, to say that on demand being made he promptly and honorably made restitution by paying for the whole time in arrear—a most remarkable fact, and nearly the only instance among the large number who have been similarly apprised of like delinquencies."

As we have been able from various sources to gather some impression as to the history of commutation rates, there can be little doubt that commutation traffic was regarded originally as a mere incident to through traffic and was attractive because it could be handled at little additional cost to the carrier. But it is undeniable that the enormous growth of suburban communities in recent years, and particularly around the great cities such as New York and Chicago, has resulted in material changes both in the character and the cost of commutation service.

The commutation service of the Lackawanna is an instance of that kind. It operates 102 passenger trains a day in each direction, into and out of New York, of which but 7 trains each way go beyond the limits of the State of New Jersey. And the traffic in some cases is highly competitive; the electric lines actively reach out for it often to the limits of the most distant suburban zones of the regular lines.

Without going further into the history of commutation or the details that distinguish it from other passenger traffic, we are led to conclude from all these considerations that it stands by itself as a special and distinct kind of service for which the carrier may demand no more than a reasonable compensation.

This being so, we see no reason why the reasonableness of the fares demanded for the service may not be looked into by the commission under section 1. It is conceded on behalf of the principal complainant that a carrier may not be compelled, under the present law, to undertake a commutation service and to establish commutation rates. That is probably true. But having undertaken a definite and regular commutation service, such as is shown of record on the part of each of the defendants in this proceeding, the power as well as the duty of the commission under section 1 to examine into the reasonableness of the charges exacted, when complaint has been made, seems to be be-

yond question. We therefore pass to the question whether the rates complained of are reasonable.

The increased fares are justified by the several carriers on their briefs and arguments on the following grounds:

1. That the former fares were unduly low and that the commutation traffic was not bearing its due proportion of the operating expense.

2. That the commutation traffic had outgrown the facilities devoted to it, and in some cases had required the practical rebuilding of the tracks by which it is handled. In the case of the Lackawanna, for example, it is stated that nearly \$15,000,000 have been spent in ten years on the suburban lines and substantially the whole of it for the benefit of the suburban traffic.

3. That wages have been substantially increased. On the New Jersey division of the Pennsylvania the increase granted in 1910 amounts annually to \$1,186,416.

4. That there has been an extraordinary increase in taxes in the state of New Jersey. On that division of the Pennsylvania the taxes in 1906 amounted to \$637,564.50. In 1909 they aggregated \$1,640,092.02, or an increase in three years of 157 per cent.

5. That in some cases it has been necessary to elevate the tracks to avoid grade crossings; in other cases there exists a need of such an expenditure in the immediate future.

6. That the increase in the number of commutation trains and the shortening of the time schedules have added to the cost of the service.

Some of the old fares on some of the respondent lines had been in effect without change from 15 to 30 years, and in some instances for as long possibly as 40 years.

In the new fares of the Central of New Jersey we find a general test by which we may fairly measure the reasonableness of the present fares of all the defendants. So far as we know no objection had been made to the former fares of that company, although they seem to have been somewhat higher than the former fares of other lines leading into New York city. In general the increase over its former fares amounted to but 25 cents a month, although in a few cases it was somewhat in excess of that amount.

The increase in the present fares on the Lehigh Valley, as compared with its old fares is also very slight. If now we are to recognize its right to increase its fares somewhat in view of the increased cost of conducting the traffic, the present fares of that line may also be accepted with those of the Central of New Jersey as a fair general test of the reasonableness of the present fares of the other respondents. Only on the Erie and the Lackawanna, and in a few cases on the West Shore, were the increases substantial in amount, and yet the new fares of these lines, when compared with the new fares of the Lehigh Valley and the Central of New Jersey do not differ from them materially except in particular instances. Of course, no absolute scale could be adopted for use on all these lines. Local conditions must necessarily require and justify slight variations in each case. Nevertheless, taking the general scale of the Lehigh Valley and the Central of New Jersey as a general measure and test of the fares of the other lines, and considering the situation from the standpoint of the carriers as well as from the standpoint of the commuter, a broad view of the matter requires us to find that the new fares of the Erie, the Lackawanna, and the West Shore, considered as a whole, are not unreasonable. In particular cases they are excessive. For example, the new monthly fares of the Erie to points 33 miles or more distant from New York city exceed the fares of the Central of New Jersey and Lehigh Valley to points of substantially equal distance by \$1.35 or more; and in these cases the increases over its old monthly fares vary from \$1.50 to \$3.95. While the service of that line is efficient and satisfactory, the record gives us no acceptable explanation for the higher fares to those points. We therefore find those fares to be unreasonable. The fares of the Lackawanna and West Shore to points toward the limit of their suburban zones are also materially higher than the fares of the Central of New Jersey and Lehigh Valley to points of equal distance and should be reduced. With respect to the special instances here mentioned we shall assume that the defendants named will at once revise their schedules so as to bring those fares more into conformity with the fares of the Central of New Jersey and the Lehigh Valley for the distances referred to, and that no order in that regard will be necessary.

We come now to the new fares of the Pennsylvania. A comparison has already been made between the new fares of the Central of New Jersey with the monthly cost to the commuter under the old 180-trip quarterly ticket of this company. The extent of the increase is shown in the following table:

	Miles.				
	11.4	17.3	21.5	25.8	31.3
60-trip ticket....	\$6.50	\$8.00	\$9.50	\$11.00	\$12.00
180-trip ticket...	5.40	6.00	7.33	7.67	8.33
Increase ...	\$1.10	\$2.00	\$2.17	\$3.33	\$3.67

Comparing the cost of the present monthly 60-ride tickets with the cost per month to the commuter under the old 180-ride quarterly tickets, we get the following results:

	Distance from New York (Miles).	Rate per month based on old 180-trip quarterly tickets.	Present rate of 60-trip monthly tickets.
Newark	8.7	\$5.40	\$6.00
Elizabeth	14.1	5.40	6.50
Linden	17.3	6.00	8.00
Rahway	19.4	7.00	9.00
Menlo Park	23.9	7.66	10.50
Metuchen	25.8	7.67	11.00
New Brunswick	31.3	8.33	12.00

Such increases per month as these certainly require a definite explanation on the part of the carrier. Its contention was that the increased charges are justified by reason of the great cost of elevating its tracks, because of its increased taxes, the increase in its pay roll, and because of the cost to it of the use by its commuters of the McAdoo tunnel which now forms a part of its suburban service. Obviously it may fairly take these matters into consideration in readjusting its fares, but in doing so it cannot demand of its commuters more than a reasonable charge for the service.

After a careful study of the record we see no justification, either in the value to the commuter of the service rendered by that line or in the cost to it of the service, for such a large difference in the fares demanded of the commuter. Many exhibits were offered on both sides on which the cost of the service to that defendant is analyzed with differing results. We shall not here go into the details of these computations. It will suffice to say that they have been examined with great care and that the result of our study of the whole record with respect to the new fares of this company is the conclusion that they are unreasonable and excessive.

We see no occasion to disturb the 50-ride and 10-ride fares of the Central of New Jersey or the Lehigh. That the new 50-trip fares of the Erie, the Pennsylvania, the Lackawanna, and the West Shore are higher than they should be, we think is clear, but we shall not enter an order with respect to those tickets at this time. We shall expect those defendants, however, promptly to take those fares under advisement and to suggest to the commission the reductions which should be made in order to meet the general conclusions here expressed.

The proceedings against the New York, New Haven & Hartford were instituted by the commission on informal complaints, and the record touching the reasonableness of its new fares is largely confined to testimony by the officials of that company. It does not give us sufficient information upon which to reach satisfactory conclusions. (21 I. C. C. 426.)

STATE COMMISSIONS.

The Louisiana Railway Commission has ordered all railways to provide step boxes for passenger cars except where there is a filled-in and elevated platform.

The Public Utilities Board of New Jersey has suspended until October 3 the increases in passenger rates which were filed by the Pennsylvania Railroad, the Erie, the Lehigh Valley, the Central of New Jersey, the Buffalo, Susquehanna & Western, and the Philadelphia & Reading.

The Railway Commission of Louisiana has ordered all railways to charge only actual fare for mileage traveled between points in Louisiana; and the order provides that when the amount ends in less than ½ cent, the fraction shall be dropped, and when the amount is ½ cent or more, the next highest whole cent shall be charged.

Public Service Commission—Second District.

The New York Public Service Commission, second district, has denied permission to the Long Island Railroad to discontinue L. C. L. freight service at Hewlett station and to transfer the handling of such freight to the Woodmere station.

The company claimed that the stoppage of freight trains for the freight on the main track at Hewlett interfered with passenger trains. Definite proof of such actual interference was not submitted. It appeared that no material economy in operation would result from the change beyond saving the cost of stopping the local freight trains at Hewlett. The desire of a railway which is more largely engaged in the transportation of passengers than of freight to consolidate the freight operations of expanding small localities where they practically merge physically and become general communities while remaining separate village entities is recognized as having weight, and where this can be done without considerable public inconvenience, while at the same time it appears that the passenger service would be relieved of serious interference so that the net result to the public is beneficial, special applications of that character should receive favorable consideration; but this case does not fall within that rule, and therefore the petition is denied.

COURT NEWS.

Suit has been brought against the Louisville & Nashville by the state of Kentucky, to collect about \$500,000 back taxes, which it is claimed were due during the past four years.

Attorney general Wickersham has directed the government's special counsel in the Union Pacific-Southern Pacific merger case to prepare and file as quickly as possible an appeal to the supreme court against the ruling of the circuit court, which found that the acquisition of the Southern Pacific by the Union Pacific was not in conflict with the Sherman anti-trust law.

President Ripley of the Atchison, Topeka & Santa Fe, is quoted as saying in regard to the Spokane and Inter-Mountain rate decisions of the Interstate Commerce Commission: "We will fight the decision of the commission and appeal to the Commerce Court. What the Southern Pacific, the Hill Lines and the Denver & Rio Grande will do we do not know as yet, but the Atchison will not stand without appeal a judgment which means a reduction of many millions yearly in the net earnings of the companies mentioned. It is an unjust decision."

PROJECTED LINES IN RUSSIA.

The Ministry of Ways and Communications of Russia has been granted credits from the 1911 budget aggregating \$6,027,000, of which \$75,000 has been allotted for preliminary surveys of a route crossing the Caucasus mountain range and \$500,000 for constructional works on the Kars-Sarakanytch line. Preliminary surveys have been authorized for a line from Baguerovo, via Taman to Abinskaja, connecting the Southern and Vladikavkaz systems with a branch line to Temriouk in the Kuban area, and also for a route between Beljetz and Travniki, via Tomachef, Zamostii, and Krasnostav, to connect up the Lioubline district and the Vistula system. Work has begun on the Mlava to Plotzk and Radom to Laska sections. Surveys have been completed for the Chlobine-Kamenetz-Podolsk line via Mozyr, Ovrtych, and Stara-Constantinov, for which the Minsk Zemstvo has sent in formal application for immediate construction, and they are in progress for the line between Uman and Nikolo-Kozelsk, linking the Southwest system and the Katherinski lines. The surveys of the projected Millerovo-Saratov line have been lately extended. It is now proposed to connect the Siberian railways and the Black Sea ports by this line, and supplementary surveys from Samara to Saratov have been made. It is anticipated that the Riazan-Uralsk Company and the Southeastern system will co-operate in completing the construction of the line, the permanent way from Samara to Krasni-Iar being built by the former, and thence on to Taganrog by the latter. The committee for new railways has agreed to permit the merchants of the Kubantown Eisk, Temirouk and Ekaterinodar to form a company for the construction of 185 miles of permanent way between Kouchevska and Kremenskaja, and a further 100 miles between Ekaterinodar and Akhutari. Sanction has also been granted for a line from St. Petersburg to the Finnish frontier.

Railway Officers.**ELECTIONS AND APPOINTMENTS.****Executive, Financial and Legal Officers.**

Guy J. Bunting has been appointed general accountant of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago.

Henry G. Herbel, assistant to the vice-president and general solicitor of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, has been appointed interstate commerce attorney, with headquarters at St. Louis, to succeed James C. Jeffery, resigned.

E. H. Fitzhugh, first vice-president of the Grand Trunk and of the Central Vermont, has been elected president of the Central Vermont in addition to his duties on the Grand Trunk, succeeding as president of the Central Vermont, Charles M. Hays, who becomes chairman of the board.

W. L. Roach, secretary of the Live Oak, Perry & Gulf, with office at Dowling Park, Fla., has been elected president, with office at Live Oak, succeeding J. Lee Ensign, resigned. J. H. Powell, treasurer, has been elected also vice-president, and R. P. Hopkins, general manager, has been appointed also secretary, succeeding to the duties of Mr. Roach.

John Glenn Livengood, whose appointment as auditor of the Erie Railroad, announced recently in these columns, has been appointed auditor of disbursements of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, with office at St. Louis, Mo. Mr. Livengood was born on October 28, 1873, at Rockville, Ind. He began railway work in April, 1890, with the Milwaukee & Northern, now a part of the Chicago, Milwaukee & St. Paul, and was engaged in station work for that company until August, 1892, at Marinette, Wis., and at Appleton. He was then yard clerk on the Chicago, Milwaukee & St. Paul, and in April, of the following year he went with the Minneapolis, St. Paul & Sault Ste. Marie as freight trainman. From October, 1893, to April, 1900, he was engaged in station work on the Great Northern at Minneapolis, Minn., and Superior, Wis., and then went with the Erie & Wyoming Valley, now a part of the Erie Railroad, as auditor, at Dunsmore, Pa. In March, 1901, he was appointed chief clerk to auditor of disbursements of the Erie Railroad, and from July, 1903, to July, 1911, was auditor of disbursements of that road. He was promoted to auditor on July 1, and now resigns to go to the Missouri Pacific as above noted.

Operating Officers.

C. A. Shoemaker has been appointed assistant superintendent of the Southern division of the Chicago Great Western, with headquarters at St. Joseph, Mo., succeeding F. R. Blunt, transferred, effective August 1. In our issue of July 28 Mr. Blunt's former title was incorrectly given as trainmaster.

Brown Ring has been appointed chief despatcher of the Texas & Pacific, with office at Marshall, Tex., succeeding W. H. Mulcahy, assigned to other duties.

H. L. Hill has been appointed superintendent of transportation of the Guatemala Railway, with office at Zacapa, Guatemala, succeeding G. C. Wendorf, resigned.

F. P. Abercrombie has been appointed acting superintendent of the Bedford division of the Pennsylvania Railroad, with office at Bedford, Pa., succeeding W. L. Cooper, deceased.

C. W. Bradley, formerly manager of the Western New York Car Demurrage Bureau, at Buffalo, N. Y., has been appointed superintendent of telegraph of the Chesapeake & Ohio.

Traffic Officers.

C. G. Amendt has been appointed industrial agent of the Hocking Valley, with office at Lancaster, Ohio.

Charles Letts has been appointed contracting freight agent of the St. Louis & San Francisco, with office at Los Angeles, Cal.

J. M. Allen has been appointed freight claim agent of the Chicago, Milwaukee & Puget Sound, with office at Seattle, Wash.

L. M. Turnbull has been appointed traveling freight agent of the Chicago, Rock Island & Pacific, with office at Los Angeles, Cal.

F. G. Frieser has been appointed assistant foreign freight agent of the Canadian Pacific, with office at No. 1 Broadway, New York.

F. S. Wetherby has been appointed contracting freight agent of the Great Northern at Spokane, Wash., succeeding L. J. Fitzpatrick, resigned to engage in other business.

G. J. Allen, traveling freight agent of the Atlanta, Birmingham & Atlantic, has been appointed soliciting freight agent of the Georgia Railway, with headquarters at Nashville, Tenn.

H. C. Franks, commercial agent of the St. Louis & San Francisco at San Antonio, has been appointed traveling freight agent of the San Antonio & Aransas Pass, with office at San Antonio.

J. T. Brooks has been appointed commercial agent of the St. Louis & San Francisco and the Ft. Worth & Rio Grande, with office at San Antonio, Tex., succeeding H. C. Franks, resigned.

J. D. Boylston has been appointed traveling freight agent of the Atlanta, Birmingham & Atlantic, with headquarters at Chattanooga, Tenn., succeeding G. J. Allen, resigned to go to another company.

Lyman Sholes has been appointed division freight and passenger agent of the Chicago, St. Paul, Minneapolis & Omaha, with office at Omaha, Neb., and Daniel J. Shea has been appointed traveling freight agent, with office at St. Paul, Minn.

J. M. Cousins has been appointed commercial agent of the Missouri & North Arkansas, and William B. Durrett has been appointed traveling freight agent, both with offices at New Orleans, La. The traffic office at New Orleans is a new one.

The office of C. W. Cheers, division freight and passenger agent of the Central of Georgia, at Chattanooga, Tenn., has been abolished, and all communications should be addressed to Charles T. Airey, freight traffic manager, or J. C. Haile, general passenger agent, Savannah, Ga.

C. A. Torrence has been appointed foreign freight agent of the Missouri Pacific, the St. Louis Iron Mountain & Southern, the Denver & Rio Grande, the International & Great Northern, the Texas & Pacific and the Wabash, with office in the Royal Insurance building, Chicago, succeeding F. G. Frieser, resigned to go to another company.

Daniel J. Shea has been appointed traveling freight agent of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn. Henry W. Truelsen has been appointed traveling agent, with office at Omaha, Neb. Robert L. Holmes, traveling agent, with headquarters at Omaha, has been transferred as traveling freight agent to Kansas City, Mo.

Engineering and Rolling Stock Officers.

M. Marea has resigned as master mechanic of the Toledo, St. Louis & Western.

E. E. Bradley has been appointed signal engineer of the Western Maryland, with office at Baltimore, Md.

A. C. Shields has been appointed to the new position of division engineer of the Amarillo division of the Chicago, Rock Island & Pacific.

J. W. Thompson has been appointed chief electrician of the Chicago & Alton, with headquarters at Bloomington, Ill., to succeed S. W. Dietrich, resigned.

R. L. Holmes, assistant engineer of the Texas & Pacific, with office at Dallas, Tex., has been appointed division engineer of the eastern division, with headquarters at Dallas, effective August 1.

G. F. Hess has been appointed superintendent of machinery of the Kansas City Southern and the Arkansas Western, with headquarters at Kansas City, Mo., to succeed J. W. Small, resigned to accept service with another company.

A. S. Clopton, general foreman of bridges and buildings of the Missouri, Kansas & Texas, has been appointed superintendent of bridges and buildings, with office at Parsons, Kan., succeeding F. W. Bailey, resigned.

M. H. Clapp, district superintendent of the Western Union Telegraph Company, with office at Chicago, has been appointed superintendent of telegraph of the Northern Pacific, with headquarters at St. Paul, Minn., succeeding O. G. Greene, resigned.

R. B. Seymour has resigned as chief engineer of the Chicago, Indiana & Southern and the Indiana Harbor Belt, and the office is abolished. G. C. Cleveland, assistant chief engineer of the Lake Shore & Michigan Southern, with headquarters at Cleveland, Ohio, will have charge of maintenance work on the Chicago, Indiana & Southern, and Otto Gersbach, engineer maintenance of way of the Indiana Harbor Belt, with office at Gibson, Ind., will have charge of the maintenance work on the Indiana Harbor Belt.

Special Officers.

John W. Kearney has been put in charge of the new publicity department of the Missouri Pacific.

J. A. McFarland has been appointed chemist and engineer of tests of the St. Louis & San Francisco, with office at St. Louis, Mo.

OBITUARY.

Franklin Price, formerly general advertising agent of the Chicago & North Western, died at Coatesville, Pa., on July 25, aged 90 years. He was connected with the North Western for 23 years, having begun as advertising clerk in the passenger department in 1879.

Benjamin S. Moore, said to have been the oldest railway man in New Jersey, died on August 1 at his home in Roselle in his eightieth year. For 58 years he was an engineer on the Central of New Jersey. He was engineman of the first train that ran over the Newark bay bridge. A few years ago he was retired on a pension.

John B. Ludlow, general traffic manager of the Wells, Fargo & Company Express, died on July 31, at Deposit, N. Y., at the age of 44 years. Mr. Ludlow was born in England and began railway work in this country on the Union Pacific. In 1888 he went to Wells, Fargo & Company, at New York, as a clerk, and was later made superintendent of traffic, then traffic manager, and when he died was general traffic manager.

Edward P. North died on July 20 at his home in New York. Mr. North was 76 years old. He graduated from Union College in 1856, and began his professional career with E. S. Chesborough, Chicago. His railway engineering experience was mostly in work on the early western roads, particularly on the Union Pacific, where he was superintendent of tunnel construction. He was also chief engineer of the New Canaan Railway, and at another time chief engineer of the Durango & Sinaloa of Mexico. He served as a delegate to the International Congress on Waterways. In 1895 he was made water purveyor of the city of New York. Much of his work has been in highway construction, and in 1879 he won the Normal medal of the American Society of Civil Engineers for a paper on this subject.

Harry F. Campbell, secretary of the per diem Arbitration committee and chief clerk to Arthur Hale, general agent of the American Railway Association, died Friday morning, July 28, on a Pennsylvania train, between Harrisburg and North Philadelphia, while en route to his home in New York. Mr. Campbell entered the service of the American Railway Association as the first secretary of the Arbitration committee at the time of the adoption of the per diem rules agreement in 1902. He subsequently served as chief clerk to Ralph Peters, president and general manager of the Long Island. In 1906 Mr. Campbell was appointed chief clerk to Mr. Hale, chairman of the committee on Car Efficiency of the American Railway Association, which position he held up to the time of his death.

In this capacity Mr. Campbell organized and has supervised the working of the American Railway Clearing House. His early railway work was in the transportation department of the Pennsylvania Railroad, where he was acting as special agent at the time he left the Pennsylvania to enter the service of the American Railway Association.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE WABASH is asking prices on 15 consolidation and 5 switching locomotives.

THE PENNSYLVANIA LINES WEST, it is rumored, will order 60 locomotives in the near future. This item has not been confirmed.

THE GRAND TRUNK has ordered 10 compound consolidation locomotives from the American Locomotive Company. The dimensions of the cylinders will be 22½ in. and 35 in. x 32 in., the diameter of the driving wheels will be 63 in., and the total weight in working order will be 210,000 lbs.

THE BINGHAM & GARFIELD has ordered 1 Mallet articulated compound locomotive (0-8-8-0) from the American Locomotive Company. The dimensions of the cylinders will be 26 in. and 41 in. x 28 in., the diameter of the driving wheels will be 51 in., and the total weight of the locomotives in working order will be 450,000 lbs.

THE LOUISIANA & NORTHWEST has ordered 3 ten-wheel locomotives from the Baldwin Locomotive Works. The dimensions of the cylinders will be 18 in. x 26 in., the diameter of the driving wheels will be 56 in., and the total weight in working order will be 130,500 lbs.

THE CANADIAN NORTHERN, as reported in the *Railway Age Gazette* of July 21, has ordered 20 consolidation locomotives from the Canada Foundry Co. The general dimensions and specialties are as follows:

Tractive effort	45,000 lbs.
Weight on drivers.....	190,000 lbs.
Weight on leading truck.....	25,000 lbs.
Total weight	215,000 lbs.
Cylinders	24 in. x 32 in.
Boiler, type	Wagon top
Working pressure	180 lbs.
Superheater	Schmidt
Firebox	110 in. x 64 in.
Tubes, number	272
Tubes, diameter	2 in.
Grate area	49 sq. ft.
Valves, diameter	12 in.
Driving wheels, diameter.....	63 in.
Driving journals	10 in. x 14 in.
Engine truck wheels, diameter.....	30 in.
Engine truck journals.....	6 in. x 12 in.
Water capacity	6,000 gal.
Coal capacity	10 tons

THE ATCHISON, TOPEKA & SANTA FE, as mentioned in the *Railway Age Gazette* of July 7, has ordered 24 Mallet, 29 switching and 28 Pacific type locomotives from the Baldwin Locomotive Works. The principal dimensions of these locomotives will be as follows:

Type	Mallet	Pacific
Simple or compound.....	Compound	Compound
Weight on drivers.....	304,300 lbs.	160,000 lbs.
Total weight	370,200 lbs.	250,000 lbs.
Diameter of cylinders.....	24 in. and 38 in.	17½ in. and 29 in.
Stroke of pistons.....	28 in.	28 in.
Diameter of drivers.....	69 in.	73 in.
Type of boiler.....	Conical waist	Wagon top
Working steam pressure.....	220 lbs.	210 lbs.
Heating surface, tubes.....	4,823 sq. ft.	3,088 sq. ft.
Heating surface, firebox	236 sq. ft.	234 sq. ft.
Heating surface, superheater.....	.....	811 sq. ft.
Heating surface, total.....	5,059 sq. ft.	4,133 sq. ft.
Tubes, number	290	290
Tubes, diameter	2¼ in.	2¼ in.
Tubes, length	19 ft. 7 in.	18 ft. 2 in.
Firebox, type	Jacobs-Shupert	Jacobs-Shupert
Firebox, length	120 in.	110 in.
Firebox, width	76 in.	76 in.
Firebox, material	Steel	Steel
Grate area	63 sq. ft.	58 sq. ft.
Tank capacity	9,000 gal.	9,000 gal.
Fuel capacity	12 tons	12 tons

Type.	Switching
Simple or Compound.....	Simple
Total weight.....	141,880 lbs.
Diameter of cylinders.....	20 in.
Stroke of pistons.....	26 in.
Diameter of drivers.....	51 in.
Type of boiler.....	Wagon top
Working steam pressure.....	180 lbs.
Heating surface, tubes.....	1,703 sq. ft.
Heating surface, firebox.....	180 sq. ft.
Heating surface, total.....	1,883 sq. ft.
Tubes, number.....	275 sq. ft.
Tubes, diameter.....	2 in.
Tubes, length.....	11ft. 9 in.
Firebox, type.....	Jacobs-Shupert
Firebox, length.....	110 in.
Firebox, width.....	32 in.
Firebox, material.....	Steel
Grate area.....	24 sq. ft.
Tank capacity.....	3,900 gal.
Fuel capacity	12 tons

CAR BUILDING.

THE ATLANTIC SEABOARD DISPATCH, Chicago, is in the market for 100 refrigerator cars.

THE WABASH is asking prices on 6 coaches and 6 combination passenger and baggage cars.

THE GRAND TRUNK is in the market for 25 steel underframe coaches and for 25 express cars.

THE CHILEAN STATE RAILWAYS have ordered 288 freight cars from the Middletown Car Works.

THE BALTIMORE & OHIO is in the market for 4 dining cars and some baggage and postal cars.

THE HAVANA CENTRAL has ordered 360 sixty-ton box cars from the Standard Steel Car Company.

THE ARMS HORSE PALACE CAR COMPANY, Chicago, has ordered 25 special horse cars from the Pullman Company.

THE GRENVILLE, ANDERSON & SPARTANBURG (Electric), Charlotte, N. C., has ordered 17 high speed interurban cars from the Jewett Car Company.

THE MISSOURI PACIFIC is in the market for 1,000 box cars, 500 stock cars and 400 automobile cars. This is in addition to the equipment mentioned in the *Railway Age Gazette* of July 28.

IRON AND STEEL.

THE NEW YORK CENTRAL is in the market for 1,500 tons of bridge material.

THE CANADIAN PACIFIC has ordered 3,000 tons of rails from the Lackawanna Steel Company.

THE GEORGIA CENTRAL has ordered 11,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

THE LAKE SHORE & MICHIGAN SOUTHERN has ordered 900 tons of bridge material from the American Bridge Company.

THE MISSOURI, KANSAS & TEXAS has specified that one-tenth of 1 per cent. metallic titanium shall be used in the 6,000 tons of rails recently ordered.

GENERAL CONDITIONS IN STEEL.—During the past week the Steel Corporation produced steel at the rate of about 14,000,000 tons a year. The record output for a full year was in 1910 when 14,179,369 tons were produced. The Steel Corporation is now operating at 76 per cent. of its capacity—the high record of steel operations since the first of the year. The volume of orders is satisfactory and inquiries are large, especially for railway equipment. It is generally believed that equipment inquiries and orders will be heavy from now until the end of the year. Satisfactory business in the other steel departments is also expected.

Supply Trade News.

The Parkesburgh Iron Company, Parkesburgh, Pa., has moved its New York offices to 30 Church street.

The Isthmian Canal Commission will receive bids until August 21 on miscellaneous supplies, including locomotive tires.

N. S. Reeder, vice-president of the Western Steel Car & Foundry Company, Chicago, has been made second vice-president of the Pressed Steel Car Company, Pittsburgh, Pa., with office in Chicago.

The McKeen Motor Car Company, Omaha, Neb., has received orders from the Oregon Short Line for a second 70 ft. motor car, and from the Ann Arbor for a fifth car. There are now 116 of these cars in service in the United States.

Edward F. Pride has been elected secretary and assistant treasurer of the Standard Coupler Company, New York, succeeding the late Alexander W. Taylor, who died on June 19 last, after an honorable service of 17 years with that company. Mr. Pride has been in the employ of the Standard Coupler Company for 14 years, having been for several years assistant superintendent of its works at Bridgeport, Conn.

Edwin M. Herr, vice president of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., was made president of the company at the special meeting of the newly elected board of directors held in Pittsburgh on August 1. Mr. Herr succeeds Edwin F. Atkins, who was made temporary president of the company a year ago. H. P. Davis, manager of the engineering department of the East Pittsburgh works, was elected vice president. Calvert Townley has been made assistant to the president. Mr. Atkins will continue to be a director of the company.

The United States Light & Heating Company, New York, has received an order from the New York, New Haven & Hartford for 100 axle-lighting equipments and National storage batteries. Orders have also been received recently from the St. Louis & San Francisco, the New York Central, the Erie, the Missouri, Kansas & Texas, and the Pullman Company. The company reports that 3,300 equipments are in use on 51 railways and transportation companies throughout the country, and that the new plant at Niagara Falls, N. Y., is now operating with 600 men.

The Hayes Track Appliance Company, Richmond, Ind., recently placed on the market a new style of derail, model CP, for use in connection with interlocking. This derail is similar in form and size to model C but has the reversible central eyebolt like model AP. This permits of three connections to the derail. The operating rod is attached to the eyebolt while the facing point lock and wire bolt-lock are attached to the cast lugs. The eyebolt is drop forged and passed through two webs of the derail block. It is reversible and is held in place by double jam nuts.

TRADE PUBLICATIONS.

CAR CURTAINS.—The Curtain Supply Company, Chicago, has published a full catalog of its car curtains, curtain fixtures, roller diaphragms and curtain materials. The illustrations and descriptions show the simplicity of the mechanism and ease of operation of these curtains.

SOUTHERN PACIFIC.—The passenger department of this company has published a very attractive, illustrated booklet on The Dalles, Oregon, which tells of the great productivity and the diversity of resources of this locality, as well as the low prices at which land may be obtained.

SIGNALS.—The Hall Signal Company, New York, has published a very full loose-leaf catalog illustrating and describing its line of automatic signal appliances. Order numbers and price lists are included. Additional pages will be published from time to time for insertion in their proper place.

MOTOR CARS.—The General Electric Company, Schenectady, N. Y., has published bulletin No. 4855 on its double-track type

gas electric motor cars. The bulletin is fully illustrated, contains a detailed description of this car and considerable other data relative to the subject. Plans and elevations of cars of various sizes are also given.

SOUTHERN PACIFIC.—The passenger department of this company has issued an illustrated pamphlet on the John Day Valley, Oregon. The purpose of this booklet is to interest prospective home seekers in that region, and, judging from the accounts of the general conditions and great productivity and the diversity of resources that may be found there, it will accomplish its end.

MICHIGAN CENTRAL.—The passenger department of this company has issued a small booklet devoted to vacation tours between Chicago, New York and Boston. Prices are given. The company has also published a small illustrated folder on the vacation resorts of Michigan. Pastimes and attractions are described in an attractive manner and the prices of accommodations are given.

NORTHERN PACIFIC.—This company has published a booklet on the attractions of the Minnesota lakes. The many illustrations show the variety of pastimes and the scenic beauties which may be found in this region. A brief account of each resort is given, and a list of hotels, boarding houses and their rates, is included. This company has also published a very attractive booklet called Through Wonderland, which is devoted to Yellowstone National Park. Large colored illustrations show the great variety of scenery that is to be found there and an interesting account of the park and its many interests are included.

THE LONDON & NORTH WESTERN.—This company has published seven booklets telling of the ideal vacation spots in England, Ireland, Wales and Scotland. These booklets deserve more than a casual perusal; they are worthy of close study. Compiled with characteristic British thoroughness, they cover their field admirably. The easy style and vivid descriptions, supplemented by carefully selected photographs, make delightful reading even if there is no ulterior object in view. Countless historical and literary allusions are worked in in such a fascinating manner that there is scarcely an inn, a rock, or a castle mentioned that was not once the scene of some romantic episode or heroic feat. These books are guide books rather than railway advertisements. Only the briefest mention is made of train accommodations, and even that is in the form of an introduction. Many hotels, boarding houses and even shops advertise in them, for it is known that these booklets are not merely glanced at and thrown aside. Little tours are planned and the prices of each are included. The importance and value of such booklets to the passenger department is a recognized thing, and while it would be impossible to use these as exact models in this country owing to the far greater area and the comparative dearth of historical and literary associations, yet these particular books should be studied carefully by our passenger departments. The ideal to be striven for is not to publish literature which has served its purpose when the trip is planned, but to publish booklets which are worth reading for themselves alone and which will be taken on the trip. If this is accomplished an increase of trips will necessarily follow.

FOREIGN RAILWAY NOTES.

The Chilean government has 1,491 miles of railway under construction at an estimated cost of \$74,933,300. The work already done on these lines has cost \$24,645,790. In addition to the foregoing, there are 694 miles of railway under consideration. When these lines are completed the government will control about 3,600 miles of railway. Parties desiring to get in touch with this work should correspond with the Director General de Industrias y Obras Publicas, Santiago, Chile.

The boring of the tunnel under Kao Plyng mountain, on the Northern Railway of Siam, which was begun on April 17, 1908, was completed on April 3, 1911. It has thus taken about three years to bore through 320 yds. of very hard stone, the length of the tunnel. The cost of the work has been officially placed at about \$296 per yard, or a total of \$97,384. Chinese labor was used at first, but was discontinued on account of sickness, and local native workmen were employed, and these successfully completed the work.

Railway Construction.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE COAST LINE.—According to press reports, a line will be built from Ivanpah, Cal., to the Yellow Pine mining district, near Good Springs, Nev., about 25 miles.

ATCHISON, TOPEKA & SANTA FE.—The Port Bolivar Iron Ore Railway, which is under construction from Longview, Tex., to Ore City (a new town), will, it is said, be extended from the latter place to Clarksville, about 74 miles. This project is backed by the Atchison, Topeka & Santa Fe.

CALIFORNIA ROADS (Electric).—The Co-Operative Electric Power Company will build a line, it is said, from Portersville, Cal., north to Lindsay, 10 miles, and from Portersville, northwest to Tulare, 20 miles, in all 30 miles. Rights-of-way have been secured.

CANADIAN ROADS.—See article on "Canada's Projected Lines under General News.

CENTRAL OF NEW JERSEY.—According to press reports, this company has awarded a grading contract for a detour at Glen Onoko, Pa., to take the place of a tunnel condemned some time ago. This work will cost about \$1,000,000.

CORNING, KEUKA LAKE & ONTARIO.—An officer writes that this line will be built from Corning, Steuben county, N. Y., north to Sodus Bay, Wayne county, on Lake Ontario, 90 miles. The prospects of building the line are good, but no track has been laid as yet. Contracts have been let to W. J. Kelly, New Orleans, La. The road will carry coal, lumber and farm products. J. C. Zimmerman, president, and W. J. Sloan, chief engineer, both at Bradford, N. J. (July 28, p. 198.)

FRESNO, HANFORD & SUMMIT LAKE (Electric).—This line will be extended, it is said, from Fowler, Cal., south to Hanford, about 23 miles.

ILLINOIS CENTRAL.—An officer writes that this company is double-tracking its line from Ponchatoula, La., to Orleans Junction, about 36 miles.

LAKEVIEW TRACTION.—An officer of this company, which now operates a 10-mile electric line, writes that the line will be extended from Memphis, Tenn., southwest to Clarksdale, Miss., 80 miles; from Memphis, Tenn., northeast to Covington, 35 miles, and from Memphis, east to Collierville, 24 miles, a total of 139 miles. The prospects of building the line are good.

LARAMIE, HAHNS PEAK & PACIFIC.—According to press reports, contracts have been let to P. J. Cain for the greater part of the grading from Cowdrey, Colo., to Walden and Hebron. It is expected that the grading to Walden will be completed by the end of September. Rails are being laid on 25 miles extending southwest from Foxpark, Wyo. (March 3, p. 433.)

LONG ISLAND RAILROAD.—See an item regarding grade crossings under General News.

MEXICAN ROADS.—According to press reports, the line which is to be built from Guadalajara, Jalisco, Mex., to Chamela, on the Pacific coast, will not enter Guadalajara at first, but will connect with the Ameca branch of the National Railways of Mexico at La Viga. It will pass through Autlan and other important mining districts. The plans for construction are well advanced.

MIDLAND PENNSYLVANIA.—An officer writes that this company will build from Millersburg, Pa., on the Susquehanna river, northeast via Sacramento and Gordon to Ashland, on the Philadelphia & Reading, 44 miles. The prospects of building the line are good and some track has already been laid. Contracts have been let to the Pinkerton Construction Company and the Lykens Valley Construction Company, Philadelphia. W. E. Harrington, president, and William McLean, chief engineer, both of Philadelphia. (March 3, p. 434.)

NEW YORK, WESTCHESTER & BOSTON.—The main line between New York and Mount Vernon is expected to be ready for operation by the winter of 1911. See this company under Railway Financial News.

NORFOLK & WESTERN.—See an item under General News, concerning the proposed elimination of grade crossings near Columbus, Ohio.

OAKLAND & ANTIOCH (Electric).—Bids for the construction of a tunnel between Oakland, Cal., and Walnut Creek are being asked for by J. G. White & Co., Oakland. (July 21, p. 159.)

OGDEN RAPID TRANSIT.—This company, it is said, will extend its line from Brigham City, Utah, northeast to Logan, about 20 miles.

PACIFIC & IDAHO NORTHERN.—This road, it is said, will soon award a contract for the construction of the line from New Meadows, Idaho, to Lardo, about 10 miles.

PASADENA RAPID TRANSIT.—This company, which was incorporated some time ago with a capital of \$3,000,000, has secured right-of-way, it is said, between Los Angeles, Cal., and Pasadena, about eight miles, and will commence construction work soon. Horace M. Dobbins, president.

PORT BOLIVAR IRON ORE.—See Atchison, Topeka & Santa Fe.

RED OAK & NORTHEASTERN.—See Wabash Railroad.

SACRAMENTO-WOODLAND (Electric).—This company, with \$1,000,000 capital, has filed articles of incorporation at Woodland, Cal., to build from Woodland to Sacramento, 20 miles. T. T. C. Gregory and William Pierce, Suisun, and C. J. Goodsell and G. A. Posey, San Francisco, are incorporators.

SOUTHERN PACIFIC.—A line will be constructed, it is said, from Colfax, Cal., northwest to Nevada City, thence south to Grass Valley, about 18 miles.

A cut-off will be built, it is said, from Battle Mountain, Nev., southwest to Hazen. The estimated cost of the work is \$7,000,000. The elimination of the Humboldt river curve will save about 50 miles.

SOUTHWESTERN TRACTION & POWER COMPANY (Electric).—An officer writes that the first division of this line will be built from Spanish Lake, La., via New Iberia to Jeanerette, 17 miles. The general contract has already been let, and construction work will be begun within a month. The engineering work will not be difficult as the country is level. Passengers, freight and inter-urban express will be carried. Electricity for power and lighting will also be furnished. The offices of the company are at New Orleans.

SPRINGFIELD NORTHWESTERN INTERURBAN.—Incorporated in Illinois with \$15,000 capital and office at Springfield, Ill. The plans call for building from Springfield, north via Athens, Petersburg and Greenview to Mason City, about 40 miles. The incorporators include: H. T. Tice, Greenview; R. Y. Kinkead, Athens; W. F. Workman, Springfield, and S. F. Prather, Springfield.

STOCKTON & BAY CITY SHORT LINE (Electric).—This company has been organized at Stockton, Cal., with \$750,000 capital, and will soon file incorporation papers to build a line from Stockton to Byron, about 20 miles.

WABASH RAILROAD.—An officer writes that the Red Oak & Northeastern will be built from Imogene, Iowa, on the Wabash Railroad, northeast to Red Oak, 13 miles. The line will later be extended from Red Oak, northeasterly via Greenfield and Winterset to Des Moines, about 110 miles in all. The prospects of building are good, but no track has been laid as yet. Contracts for grading work will be let immediately. The work will not be heavy. The road will carry agricultural products and manufactures. (July 14, p. 105.)

RAILWAY STRUCTURES.

BUFFALO CREEK, N. Y.—The Lake Shore & Michigan Southern will put up a 125-ft. span, single-leaf double track bascule bridge over the Buffalo creek. This bridge will be built by the Strauss Bascule Bridge Company, Chicago.

CHAMBERSBURG, PA.—Work has been commenced, it is said, by the Cumberland Valley on a viaduct through Chambersburg, Pa. There will be a 30-ft. cut at Waynesboro Junction. The work will cost about \$900,000. This company has also com-

pleted plans, it is said, for a new passenger station to be built at Chambersburg.

COLFAX, WASH.—The Spokane & Inland Empire will, it is said, build a new depot at Colfax.

FORT SMITH, ARK.—The Kansas City Southern is asking bids on a large modern passenger station to be built at Fort Smith in the near future.

FT. WAYNE, IND.—The Wabash has prepared plans for a brick freight house, one story, 200 ft. x 30 ft., to cost about \$50,000.

GLEN ONOKO, PA.—The Central of New Jersey will build a bridge across the Lehigh river at Glen Onoko, near the Lehigh Valley Railroad bridge.

KENMORE, OHIO.—The Northern Ohio Traction & Light Company, Akron, Ohio, will build a central car house and repair shops at Kenmore, at a cost of about \$135,000.

MANCHESTER, IA.—The Illinois Central will build a freight house 30 ft. x 100 ft., together with the necessary side tracks and platforms, at an estimated cost of \$12,000.

OAKLAND, CAL.—The Southern Pacific, according to press reports, has awarded a contract to the MacArthur Concrete, Pile & Foundation Company, Seattle, Wash., for piling for the new station at Oakland. The general contract for the building has been given to James Stewart. The cost, it is said, will be about \$200,000. (June 9, p. 1335.)

PORT BOLIVAR, TEX.—The Gulf, Colorado & Santa Fe has authorized an expenditure of \$340,000 for improvements at Port Bolivar. These include a lumber shed, three sunken tracks to run next to the lumber shed, a skidway 1,200 ft. long, a 10-ton movable derrick and a bulkhead 2,770 ft. long, to cost about \$60,500. In addition to the above the company will build a new steel re-enforced concrete ore docks which will have a capacity of 50 tons of ore per hour, and will cost approximately \$200,000.

PORTLAND, ORE.—The Mount Hood Railway & Power Company will build a new terminal at Portland, it is said, at a cost of \$45,000.

ST. LOUIS, MO.—The St. Louis Southwestern will probably build a freight warehouse at St. Louis, to cost about \$750,000.

SAN PEDRO, CAL.—According to press reports, the Southern Pacific has started work on a large single span lift bridge at San Pedro. This bridge will be 187½ ft. long and will carry double tracks. It will be operated by electricity. The bridge must be finished within a year.

SIBLEY, MO.—The Atchison, Topeka & Santa Fe, it is said, will start building a bridge across the Missouri river at Sibley within a short time. The material for the bridge is already on the ground.

SLATON, TEX.—The Atchison, Topeka & Santa Fe has awarded the contract for a passenger station and eating house, 60 ft. x 80 ft., two stories, of reinforced concrete construction, to cost about \$35,000. The building will be used by the Pecos & Northern Texas.

A decree has been promulgated by the president of Chile directing the manager of the government railways to enter into a contract with Chilean manufacturers for a period of 10 years for the construction of all the cars needed on the government railways for that time. The cars are to be of steel construction and finished in native woods at maximum price as follows, ready for delivery to the railways: First-class vestibuled coaches, \$10,950; third-class coaches, \$6,950; baggage cars, \$5,475; 20-ton coal cars, \$1,259; 20-ton stock cars, \$1,825; 20-ton box cars, \$1,752; 20-ton flat cars, \$1,314. There will be an opening for a lot of material, since all of the steel must be imported in shapes and simply put together there, finished and painted. The wheels and trucks will be imported, as will be locks, brakes, couplings, etc. From present indications it seems doubtful whether the local manufacturers will be able to supply the full demands of the government railways for two or three years at least. The names of two firms prepared to engage actively in furnishing cars are on file in the Bureau of Manufactures and may be obtained by interested parties.

Railway Financial News.

BALTIMORE & OHIO.—See Big Level & Kinzua.

BIG LEVEL & KINZUA.—This railway, less than a mile long, connecting the Baltimore & Ohio with the Erie and the Buffalo, Rochester & Pittsburgh, has been bought by the Baltimore & Ohio.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has bought, it is understood, the 24 miles of track of the Little Rock, Hot Springs & Western running from Little Rock, Ark., to Benton, for \$480,000. This line from Little Rock to Benton has heretofore been leased by the C. R. I. & P., and the track from Benton to Hot Springs is leased to the St. Louis, Iron Mountain & Southern.

DETROIT, TOLEDO & IRONTON.—The receivers have called for payment \$10,000 receivers' certificates issued February 21, 1910.

INTERNATIONAL & GREAT NORTHERN.—A press despatch from Austin, Tex., says that it is learned "from an authoritative source" that the railway commissions have told the receiver that they will refuse to place a valuation of \$35,000,000 on the property. This is the valuation required under the plan for reorganization.

LITTLE ROCK, HOT SPRINGS & WESTERN.—See Chicago, Rock Island & Pacific.

LOUISVILLE & NASHVILLE.—See item in regard to this company under Court News.

NATIONAL RAILWAYS OF MEXICO.—It has been rumored that control of the National Railways of Mexico was no longer held by the Mexican government. D. P. Bennett, vice-president, with office at New York, says: "Control of the National Railways of Mexico was secured by the Mexican government through the carrying out of the terms of the plan for the consolidation of the National Railroad of Mexico and the Mexican Central. In that plan it was distinctly stipulated that control should be lodged with the Federal Government. The government secured, has held, and so far as I know, still holds a legal majority of the outstanding stock. This control was obtained and held independently of the personal holdings of any representatives of the government."

NEW YORK CENTRAL & HUDSON RIVER.—A member of the firm of J. P. Morgan & Co., New York, is quoted as saying that the New York Central is seeking to formulate a plan for the consolidation of all its lines and subsidiaries within the state of New York in one company and under one general financial and operating management.

NEW YORK, WESTCHESTER & BOSTON.—Kissel, Kinnicutt & Co., and Harris, Forbes & Co., both of New York, are offering \$17,200,000 first mortgage 4½ per cent. bonds of July 1, 1911-1946 of the New York, Westchester & Boston at 96¼, yielding over 4.70 per cent. on the investment. The bonds are guaranteed principal and interest unconditionally by the New York, New Haven & Hartford. They are part of an authorized issue of \$60,000,000 which have been approved by the New York Public Service Commission, Second district, to bear interest at not to exceed 5 per cent. The commission gave the company permission to issue \$20,000,000 of these bonds at once, of which the present offering is part, the remaining \$2,800,000 being reserved for proposed additions. The investment up to May 31, 1911, made by the New York, New Haven & Hartford in the New York, Westchester & Boston amounted to \$25,647,004.

The proposed four-track line runs from 138th street, New York, to Port Chester, N. Y., 22 miles, with a branch from Pelham, via Mount Vernon and Scarsdale, to White Plains, 13 miles, and a branch to Clason's Point, six miles. The road will have no grade crossings and is being laid with 90-lb. rail.

NEW YORK, NEW HAVEN & HARTFORD.—See New York, Westchester & Boston.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—See Chicago, Rock Island & Pacific.